

National Park Service  
U.S. Department of the Interior

Guadalupe Mountains National Park  
Texas



# GENERAL MANAGEMENT PLAN ENVIRONMENTAL IMPACT STATEMENT

Cover photo credit: Chuck Burton<sup>®</sup> 2004



## General Management Plan / Final Environmental Impact Statement

### Guadalupe Mountains National Park Culberson and Hudspeth Counties, Texas

---

Guadalupe Mountains National Park was formally established, at a size of 76,293 acres, in 1972. In 1978, Congress designated 46,850 acres of the park as wilderness. In 1988, the park was expanded by 10,123 acres to include significant resources to the west.

The last parkwide management plan is from 1976. Much has changed since then, including visitor numbers, types, and use; the designation of wilderness; and park expansion. A new plan is needed to address how resources should be managed, how visitors access and use the park, what facilities are needed to support those uses, and how the National Park Service can best conduct its operations. This document examines four alternatives for managing Guadalupe Mountains National Park for the next 15 to 20 years. It also analyzes the impacts of implementing each alternative.

- Alternative A, the alternative of no action / continue current management, would extend existing conditions and trends of park management into the future. This alternative serves as a basis of comparison for evaluating the action alternatives.
- The preferred alternative would emphasize wilderness values and restoring natural ecosystem processes while expanding opportunities for visitors to enjoy a variety of settings in the park. Enhanced interpretation would include expansion of visitor facilities and services in the Pine Springs visitor center. New administration facilities and a campground would be constructed, and improved facilities and activities would be provided at other sites throughout the park.
- Park management under alternative B would emphasize promoting wilderness values and restoring natural ecosystem processes. Campsites and horse corrals would be closed and their sites revegetated. The limited amount of new construction would primarily support resource protection. Improvements in interpretation would be less extensive than in the preferred alternative.
- Alternative C would expand opportunities for visitors to enjoy a wider range of park settings. New park access and facility improvements would provide activities, interpretation, and visitor gateways to the interior of the park from the south and west, recreation opportunities for more diverse visitor groups, and improved administrative facilities.

Only alternative B would have major, adverse impacts. These would result from the loss of visitor uses and experiences associated with frontcountry camping and horse use. The lack of administrative space in alternative B may result in moderate to major, long-term, adverse impacts on park management.

This *General Management Plan / Environmental Impact Statement* has been distributed to other agencies and interested organizations and individuals, and a notice of availability has been published in the *Federal Register*. There will be a 30-day waiting period before the record of decision is signed.





## WHY THE NATIONAL PARK SERVICE PLANS

The National Park Service plans for one purpose — to ensure that the decisions it makes will carry out, as effectively and efficiently as possible, our mission:

*The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.*

In carrying out this mandate, NPS managers constantly make difficult decisions about ways to preserve significant natural and cultural resources for public enjoyment, resolve competing demands for limited resources, establish priorities for using funds and staff, and address differing local and nationwide interests and views of what is most important. Example planning decisions include:

- How can soils be protected at Guadalupe Mountains National Park while allowing continued use of popular trails?
- How should historic structures from the parks ranching era that are now within designated wilderness be managed?
- What is the best allocation of staff and budget to optimize both visitor experience and resource protection?

Planning provides the National Park Service with methods and tools for resolving issues and promoting beneficial solutions. Planning products articulate how public enjoyment of a park can be part of a strategy for ensuring that resources are protected unimpaired for future generations.

The National Park Service is subject to legal requirements for planning that are intended to ensure that the best possible decisions are made. By law, the National Park Service must do the following:

- Conduct comprehensive general management planning.
- Base decisions on adequate information and analysis.
- Track progress made toward goals.

These processes make the National Park Service more effective, more collaborative, and more accountable.

Planning provides a balance between continuity and adaptability in a dynamic, decision-making process. The success of the National Park Service will increasingly depend on its ability to continuously process new information and use it creatively, often in partnership with others, to resolve complex, changing issues.

Planning provides a logical, trackable rationale for decision making by focusing first on why a park was established and what conditions should exist there. Meaningful decisions can be made only after these foundations are established. After the desired conditions that will be achieved and maintained have been defined, management teams can develop responses to changing situations while staying focused on what is most important about the park.

The planning process ensures that decision-makers have adequate information about benefits, costs, and impacts on natural and cultural resources, visitor use and experience, and socioeconomic conditions. Analyzing the park in relation to its surrounding ecosystem, historic setting, community, and a national system of protected areas helps park managers and staff members understand how the park can interrelate in systems that are ecologically, socially, and economically sustainable. Decisions made within this larger context are more likely to be successful over time.

Public involvement throughout the planning process provides focused opportunities for park managers and the planning team to interact with the public and to learn about

public concerns, expectations, and values. Understanding people's values regarding park resources and visitor experiences contributes to success in developing decisions that can be implemented. Public involvement also provides opportunities to share information about park purposes and significance, and to present opportunities and constraints regarding the management of park lands and surrounding areas.

Finally, planning helps ensure and document that management decisions are promoting the efficient use of public funds, and that managers are accountable to the public for those decisions. The ultimate outcome of planning for national parks is an agreement among the National Park Service, its partners, and the public on why each area is managed as part of the national park system, what resource conditions and visitor experiences should exist there, and how those conditions can best be achieved and maintained over time.



McKittrick Canyon

## SUMMARY

### PARK HISTORY AND PLANNING

Guadalupe Mountains National Park in west Texas was authorized by an act of Congress (Public Law 89-667) on October 15, 1966. It was formally established, at a size of 76,293 acres, on September 30, 1972. In 1978, Congress passed legislation designating 46,850 acres of the park as wilderness.

On October 28, 1988, Congress passed legislation that enlarged the park by 10,123 acres. The new land included gypsum and quartzose dunes in an area west of and adjacent to the park boundary. Land acquisition was completed in conformance with the park's *Land Protection Plan* (NPS 1992). All of the land identified in the 1988 legislation was deeded to the National Park Service. Additionally, 226 acres owned by The Nature Conservancy have been transferred to the National Park Service.

The last comprehensive planning effort for Guadalupe Mountains National Park was its 1976 master plan (NPS 1976). Much has changed since then. Examples include the

- evolution of patterns and types of visitor use
- Congressional designation of part of the park as wilderness
- 1988 addition of lands to the national park
- recommitment to managing the park in the spirit of protecting its wilderness resources while making the park more accessible to the public

Each of these changes has major implications for how visitors access and use Guadalupe Mountains National Park and the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations. Therefore, a new plan is needed to

- clearly define resource conditions and visitor experiences to be achieved in Guadalupe Mountains National Park

- provide a framework for park managers to use when making decisions about what kinds of facilities, if any, to develop in the national park and how to best protect park resources, provide a diverse range of visitor experience opportunities, and manage visitor use
- ensure that the foundation for decision making has been developed in consultation with interested members of the public and adopted by NPS leadership after an adequate analysis of the benefits, impacts, and economic costs of alternate courses of action

### CONTENTS OF THIS GENERAL MANAGEMENT PLAN

This document includes five chapters and a references section.

**Chapter 1: Purpose of and Need for the Plan** sets the foundation for general management planning at Guadalupe Mountains National Park.

- It describes why the plan is being prepared and what needs it must address.
- It gives guidance for the alternatives that can be considered within the framework of the park's legislated mission, its purpose, the significance of its resources, special mandates and administrative commitments, and servicewide mandates and policies.
- The chapter details the planning opportunities and issues that were raised during public scoping and initial planning team efforts. The alternatives in the next chapter address these issues and concerns to varying degrees.
- This chapter identifies the scope of the environmental impact analysis, including identification of the impact topics that were and were not analyzed in detail.



**Chapter 2: Alternatives, including the Preferred Alternative**, begins by describing the management zones that will be used to manage Guadalupe Mountains National Park in the future. It then describes four alternatives that were considered, including mitigation measures proposed to minimize or eliminate the impacts of some proposed actions. The environmentally preferred alternative is identified, and summary tables highlight differences among the alternatives and their environmental consequences.

**Chapter 3: Affected Environment** describes the areas and resources that would be affected by implementing actions in the various alternatives. It is organized to include natural resources, cultural resources, visitor use and experience, the socioeconomic environment, and NPS operations and facilities.

**Chapter 4: Environmental Consequences** describes the methods used for assessing impacts. It then analyzes the effects of implementing the alternatives on the impact topics described in the “Affected Environment” chapter.

**Chapter 5: Consultation and Coordination** describes the history of public and agency coordination and compliance during the planning effort. It also describes the qualifications of the preparers and identifies the agencies, organizations, and others who will be receiving copies of this document.

The last section of the document, “**Appendixes, Preparers and Consultants, References, and Index**” presents supporting information.

## ALTERNATIVES AND THEIR IMPACTS

This *General Management Plan / Environmental Impact Statement* presents four alternatives for future management of Guadalupe Mountains National Park. Alternative A, no action / continue current management, would not change how the

park currently is managed. The three action alternatives are referred to as the preferred alternative, alternative B, and alternative C. The action alternatives, which are based on the park’s mandates, mission, purpose, and significance, present different ways to manage resources and visitor use and to improve facilities and infrastructure in the park. Each alternative was evaluated to determine its effects on relevant impact topics, including

- soils
- plant communities and vegetation
- wildlife
- geologic resources
- paleontological resources
- archeological resources
- historic structures
- cultural landscapes
- ethnographic resources
- museum collections
- access, activities and destinations, and scenic views
- interpretation, education, and orientation
- socioeconomic environment
- park operations

### Alternative A, No Action / Continue Current Management

This alternative would maintain the conditions, visitor services, and management practices as they currently exist and would extend them into the future.

- All park lands that are undeveloped for visitor or operational uses would continue to be managed as wilderness.
- Current visitor facilities and park infrastructure would stay in existing locations.
- The park would continue to provide small areas that visitors could easily access and experience by vehicle and much larger areas that visitors could access and experience only with considerable effort and challenge.

- Cultural resources would continue to be protected and maintained in a stable condition.

Other than the Congressionally designated wilderness area, no management zoning is identified in the no action / continue current management alternative. However, backcountry lands would continue to be managed as wilderness, regardless of whether they were formally designated as such.

Alternative A would result in mostly minor, long-term, adverse impacts on natural resources, visitor use and experience, and socioeconomics. Moderate, long-term, adverse impacts on the sensitivities of American Indians would result from continued park visitation in the area of the gypsum sand dunes. Moderate, long-term, adverse impacts on park administration would result from inadequate office space and the NPS' inability to meet housing needs for critical staff.

### Preferred Alternative

The preferred alternative would emphasize wilderness values and restoring natural ecosystem processes, while expanding some opportunities for visitors to enjoy easier access to park settings. Specifically:

- The large areas of the park that have been assessed as suitable for wilderness would be zoned as designated wilderness and backcountry. In these areas, visitors would experience a wilderness situation.
- There would be a wider range of overnight and multi-day destination opportunities.
- Visitors who did not enter the backcountry or designated wilderness zones could gain an understanding of wilderness values indirectly through enhanced interpretive presentations within the more developed and more easily accessible zones.
- Visitors would have greater developed day-use and overnight opportunities

with improved facilities, greater accessibility, and enhanced exhibits.

- Cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated and protected from impacts. This would be achieved in part by actively managing visitor access in some areas.

The preferred alternative would combine preserving wilderness areas and natural settings with providing a wider spectrum of accessible areas and experiences. Wilderness threshold zoning would provide for transitions between frontcountry and designated wilderness or backcountry zones. The areas zoned as frontcountry would include most of the areas adjacent to or surrounding developed areas and would include lands near Pine Springs and Frijole Ranch; the area adjacent to and surrounding the new Salt Basin Dunes staging area; the old Signal Peak housing area, which is in one of the two NPS-owned land parcels that would be included in a proposed boundary change; and improved circulation at Williams Ranch. These areas would provide some transition from developed to natural settings while also providing larger numbers of improved access points for areas zoned as backcountry or designated wilderness.

The preferred alternative would have mostly minor, long-term, adverse impacts on most natural resource impact topics, primarily because about 100 acres of currently undeveloped land would be permanently converted to developed park facilities. Beneficial impacts would occur because of the better natural resource protection or restoration that this alternative would provide.

Most actions associated with the preferred alternative would have no adverse effects on cultural resources. However, adverse effects could result from the construction of new facilities and site restoration. Increased park-related use of the sand dunes area would result in moderate, adverse, long-

term impacts on the sensitivities of American Indians.

Beneficial effects on visitor uses and experiences would occur at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, and Ship-on-the-Desert. There could be minor, long-term, adverse impacts on visitors who desire more solitude.

Increased visitation that would result from park improvements would have beneficial impacts on regional economies and community infrastructure.

Long-term, beneficial impacts would result from the new, consolidated headquarters complex near Pine Springs, the ability to reclaim two Pine Springs housing units for their original purpose, an improved water system for fire management at Dog Canyon, and reduced maintenance of rehabilitated or realigned trail segments. Increased maintenance associated with the new facilities would have a long-term, moderate, adverse impact on park operations.

### Alternative B

This alternative would place a major emphasis on promoting wilderness values and restoring natural ecosystem processes. There would be greater opportunities than currently exist for visitors to experience untrammeled, challenging conditions. Specifically,

- The large areas of the park that have been assessed as suitable for wilderness would be zoned as designated wilderness and backcountry. In these areas, visitors would experience a wilderness situation.
- Visitors who did not access the backcountry zone areas or designated wilderness directly could gain an understanding of wilderness values through enhanced interpretive presentations in visitor facilities.

- Visitors would have greater day-use opportunities with improved and more concentrated facilities, greater accessibility in developed areas, and enhanced exhibits.
- Except at designated backcountry sites, camping in the park would be eliminated. Horse use by visitors also would end. Camping and corral sites would be restored to natural conditions.
- Actively managed visitor use levels in the designated wilderness and backcountry zones would result in reduced resource impacts and enhanced natural ecosystem processes.
- Key cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated, sometimes limiting visitor access.

This alternative would maximize the use of the wilderness threshold zone outside the designated wilderness and backcountry zones. The frontcountry zone would be limited to the use area between and adjacent to Pine Springs and Frijole Ranch, very small staging areas for the Salt Basin Dunes and Williams Ranch, and the old Signal Peak housing area. Developed zones would be bordered more frequently by wilderness threshold zones than frontcountry zones, providing little transition from developed to natural settings. New access points might be established, but would be primitive with few or no facilities.

Alternative B would have mostly beneficial impacts on most natural resource impact topics, primarily because the land currently used for camping and corrals would be restored. Beneficial impacts also would occur because of the better natural resource protection or restoration that this alternative would provide.

Most actions associated with alternative B would have no adverse effects on cultural resources. However, adverse effects could result from the construction of new facilities and site restoration. Adverse effects would result from removal of national register-



eligible structures that were remnants of historic ranching activities.

A major, long-term, adverse impact on visitor use and experience would result from eliminating camping except in the backcountry. Eliminating horse use usually would be perceived as a major, long-term, adverse impact by riders and a negligible or beneficial impact by hikers. Improved and expanded exhibits, enhancements in the attractiveness of the Williams Ranch area as a destination, and increased opportunities for solitude would be long-term, beneficial impacts.

Minor or moderate, long-term, adverse impacts on access would result from closing the road to the Salt Basin Dunes parking area, eliminating camping except in the backcountry, and eliminating horse use. Beneficial, long-term impacts on access would be associated with providing improved access and circulation at Williams Ranch and additional parking at the Salt Basin Dunes trailhead.

Beneficial impacts on the regional economy would occur because the loss of most camping opportunities in the park would increase demand for commercial camping and other overnight lodging.

Operationally, insufficient space for management and administrative activities in alternative B would have a moderate to major, long-term, adverse impacts on management and administration. Moderate, long-term, adverse impacts resulting from insufficient space also would affect the maintenance aspect of operations.

### Alternative C

Alternative C would expand opportunities for visitors to enjoy easier access to a wider range of park settings than currently exist. New park access and facility improvements would provide visitor gateways to the interior of the park from the south and west. Opportunities would be provided for a less-challenging wilderness experience that

would accommodate more diverse visitor populations. Promoting wilderness values also would be emphasized.

Easier access to multiple settings would provide visitors with a wider range of overnight and multi-day destination activities. Wilderness experiences would still be available in the park's interior, but most areas around the existing developed sites would be zoned as frontcountry rather than the more primitive wilderness threshold. The frontcountry zone would include

- most of the area near the developed zones at Pine Springs, Frijole Ranch, Dog Canyon, and McKittrick Canyon to Pratt Cabin
- the area around the Salt Basin Dunes trailhead facilities
- the old Signal Peak housing area
- the Williams Ranch staging area

These frontcountry zones would provide some transition from developed to natural settings while improving access to the backcountry and designated wilderness zones. Additional trails and developed staging areas would enhance access. The new trails would be designed to accommodate larger numbers of visitors, sometimes including those with impaired mobility.

Increases in dispersed visitor use outside developed areas would require more aggressive resource impact mitigation to maintain natural ecosystem processes. Cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated, with the goal of protecting them from impacts while accommodating visitor use.

Alternative C would have mostly minor, long-term, adverse impacts on most natural resource impact topics, primarily because about 450 acres of currently undeveloped land would be permanently converted to developed park facilities. Beneficial impacts would occur because of the better natural

## SUMMARY

resource protection or restoration that this alternative would provide.

Most actions associated with alternative C would have no adverse effects on cultural resources. However, adverse effects could result from the construction of new facilities and site restoration. Increased park-related use of the sand dunes area would result in moderate, adverse, long-term impacts on the sensitivities of American Indians.

Beneficial effects on visitor uses and experiences would occur at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, and Ship-on-the-Desert. There could be minor, long-term,

adverse impacts on visitors who desire more solitude.

Increased visitation that would result from park improvements would have beneficial impacts on regional economies and community infrastructure.

Long-term, beneficial impacts would result from the new, consolidated headquarters complex near Pine Springs, the ability to reclaim two Pine Springs housing units for their original purpose, improved water system for fire management at Dog Canyon, and reduced maintenance of rehabilitated or realigned trail segments. Increased maintenance associated with the new facilities would have a long-term, moderate, adverse impact on park operations.

# CONTENTS

Why the National Park Service Plans	iii
Summary	v
Park History and Planning	v
Contents of This General Management Plan	v
Alternatives and Their Impacts	vi
Chapter 1: Introduction	
Purpose of and Need for the Plan	3
Introduction	3
Brief History and Description of the Park	3
Purpose of the Plan	7
Need for the Plan	7
Implementation of the Plan	13
Foundation for Planning and Management	14
Legislative Intent	14
Park Purpose	14
Park Significance	14
Park Mission	15
Park Vision	15
Primary Interpretive Themes	15
Desired Conditions for Park Management	16
Research Opportunities	17
Special Mandates and Administrative Commitments	17
Servicewide Mandates and Policies	17
Relationship of Other Resource Planning and Management to This General Management Plan	19
Local Jurisdictions	19
County Jurisdictions	19
Special Districts	21
Private Entities	21
State Jurisdictions	23
Federal Jurisdictions	24
Multi-Agency Activities	24
General Management Planning Issues and Concerns	26
Introduction	26
ParkWide Issues and Concerns	27
Site-Specific Issues	29
Climate Change	34
Impact Topics – Resources and Values at Stake in the Planning Process	36
Topics to BE analyzed	36
Topics Dismissed from Further Consideration	38



## **Chapter 2: Alternatives, Including the Preferred Alternative**

Introduction	53
Formulation of Management Zones	54
Purpose of Management Zones	54
Management Zones for the General Management Plan	55
Formulation of Alternatives	60
Developing Management Concepts	60
Applying Management Zones	60
Considering Relative Costs	62
Identifying the Preferred Alternative	63
Changes from the Draft to the Final	64
Implementing the General Management Plan	67
Alternative A: No Action / Continue Current Management	68
Concept	68
Facilities and Associated Visitor Activities	68
Natural Resources	73
Cultural Resources	75
Visitor Use and Understanding	75
Park Operations	77
Boundary Adjustment	77
Costs	77
Preferred Alternative	79
Concept	79
Facilities and Associated Visitor Activities	79
Natural Resources	86
Cultural Resources	87
Visitor Use and Understanding	88
Park Operations	90
Boundary Adjustment	90
Management Principles That Address Climate Change	90
Costs	91
Alternative B	93
Concept	93
Facilities and Associated Visitor Activities	93
Natural Resources	96
Cultural Resources	97
Visitor Use and Understanding	98
Park Operations	99
Boundary Adjustment	100
Costs	100
Alternative C	101
Concept	101
Facilities and Associated Visitor Activities	101
Natural Resources	106
Cultural Resources	107
Visitor Use and Understanding	108
Park Operations	111
Boundary Adjustment	112
Costs	112

Implementation	114
Mitigative Measures	115
Natural Resources	115
Cultural Resources	117
Visitor Safety and Experiences	118
Hazardous Materials	118
Noise Abatement	118
Scenic Resources	119
Socioeconomic Environment	119
Sustainable Design and Aesthetics	119
Future Studies and Implementation Plans	120
Specific Planning Documents	120
Implementation Plans	121
Environmentally Preferred Alternative	122
Alternatives or Actions Considered but Dismissed from Detailed Evaluation	125
Summaries	127

### **Chapter 3: Affected Environment**

Introduction	145
The Park and Its Regional Context	146
Climate	147
Physiography	148
Hydrology	150
Zoogeography	150
Climate Change and Its Influence on the Park Environment	150
Natural Resources	152
Overview	152
Soils	152
Plant Communities and Vegetation	154
Wildlife	158
Geologic Resources	160
Paleontological Resources	166
Cultural Resources	167
Overview	167
Archeological Resources	167
Historic Structures	171
Cultural Landscapes	176
Ethnographic Resources	178
Museum Collections	179
Visitor Understanding and Experience	181
Visitation	181
Hiking	182
Backpacking	183
Wilderness	183
Camping	183
Horseback Riding	183
Sightseeing and Scenic Driving	183
Interpretive Programs	184
Visitor Facilities and Other Developed Areas	185

## CONTENTS

Climate Change	187
The Socioeconomic Environment	188
Regional Setting	188
Economic Conditions	188
Per Capita Income	191
Population	191
Housing	192
Nearby Communities	193
Socioeconomic Contributions of the Park	194
Park Operations, Facilities, and Equipment	195
Park Operations	195
Park Budget	197
Visitor Facilities	198
Operations Facilities and Equipment	200

## Chapter 4: Environmental Consequences

Introduction	205
Cumulative Impacts and Projects That Make Up the Cumulative Impact Scenario	205
Methods for Analyzing Impacts	208
Changes from the Draft to the Final	208
Natural Resources	209
Cultural Resources	213
Visitor Experience and Understanding	214
The Socioeconomic Environment	215
Park Operations, Facilities, and Equipment	216
Alternative A: No Action	217
Natural Resources	217
Cultural Resources	224
Visitor Experience and Understanding	228
The Socioeconomic Environment	230
Park Operations, Facilities, and Equipment	232
The Relationship between Local Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity	233
Irreversible or Irretrievable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented	233
Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented	233
Preferred Alternative	235
Natural Resources	235
Cultural Resources	238
Visitor Experience and Understanding	241
The Socioeconomic Environment	243
Park Operations, Facilities, and Equipment	244
Relationship of Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	245
Irreversible and Irretrievable Commitments of Resources	245
Unavoidable Adverse Impacts	246
Alternative B	247
Natural Resources	247

Cultural Resources	250
Visitor Experience and Understanding	253
The Socioeconomic Environment	255
Park Operations, Facilities, and Equipment	255
Relationship of Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	256
Irreversible and Irretrievable Commitments of Resources	256
Unavoidable Adverse Impacts	256
Alternative C	258
Natural Resources	258
Cultural Resources	263
Visitor Experience and Understanding	266
The Socioeconomic Environment	268
Park Operations, Facilities, and Equipment	268
Relationship of Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	269
Irreversible and Irretrievable Commitments of Resources	269
Unavoidable Adverse Impacts	269

## **Chapter 5: Consultation and Coordination**

Public and Agency Involvement	273
Public Meetings and Newsletters	273
Consultation with Other Agencies, Officials and Organizations	274
Comments on the Draft General Management Plan and Environmental Impact Statement	277
Future Compliance Requirements	277
Agencies, Organizations, and Individuals Receiving a Copy of This Document	279

## **Appendixes, Preparers and Consultants, References, and Index**

Appendix A: Legislation	283
Appendix B: Laws and Executive Orders	297
National Park Service Enabling Legislation	297
Other Laws Affecting the National Park Service	297
Appendix C: Servicewide Mandates and Policies	301
Government-to-Government Relations between American Indian Tribes and Guadalupe Mountains National Park	301
Relations with Private and Public Organizations, Owners of Adjacent Land, and Governmental Agencies	302
Natural Resource Management Requirements	303
Cultural Resource Management Requirements	317
Visitor Use and Experience and Park Use Requirements	323
Appendix D: Wilderness Eligibility Assessment	329
Introduction	329
Wilderness Eligibility Criteria	329
Wilderness Eligibility Assessment	329
Lands Not Considered For Wilderness Eligibility Assessment	330
Conclusion	330
Appendix E: Results of Choosing by Advantages Analysis	333

## CONTENTS

Appendix F: Categorized Public Scoping Comments	339
Resource Management	339
Public Use and Access	340
Facilities and Operations	342
Public Interpretation and Education	343
External Relationships	344
Appendix G: Consultation Letters	347
Appendix H: Agency Letters, and Responses to Substantive Comments on the Draft General Management Plan and Environmental Impact Statement	353
Agency Letters	353
Response to Comments	353
Purpose and Need	353
Elements of the Alternatives	361
Environmental Consequences	378
Preparers and Consultants	403
Planning Team	403
Consultants	404
Bibliography	405
Index of Key Words	411

## LIST OF TABLES

1 Conditions to Be Achieved at Guadalupe Mountains National Park Based on Servicewide Mandates and Policies	8
2 The National Park Service Has Provided Opportunities for Public Involvement throughout the General Management Planning Process for Guadalupe Mountains National Park	27
3 Guadalupe Mountains National Park Management Zones for the Action Alternatives	56
4 Costs of the Alternatives	62
5 Environmentally Preferred Alternative Analysis	122
6 Features of the Alternatives	128
7 Summary of Impacts	135
8 Recreational Visitation in 2000-2006	182
9 County Population with Projections Through 2030	190
10 County Employment, 1990 and 2000	190
11 Employment by Worker Class, 2000	190
12 Per Capita Income	190
13 Population, 1970 to 2006	192
14 Regional Population, 1990 to 2006	192
15 Future Compliance Required for Implementation of Specific Actions, Preferred Alternative	278
E-1 Results of Choosing by Advantages Analysis	334

## **LIST OF FIGURES**

Guadalupe Mountains National Park Region	4
Park Existing Conditions	6
Lands with High Resource Values	20
Landscape Units	29
Alternative A – No Action Management Zones	70
Preferred Alternative Management Zones	82
Alternative B - Management Zones	94
Alternative C - Management Zones	102
Natural Resource Distribution Analysis	153
Vegetation Types	155
Visual Resource Distribution Analysis	165
Cultural Resource Distribution Analysis	168
Wilderness Eligibility	331





# CHAPTER 1: INTRODUCTION





## PURPOSE OF AND NEED FOR THE PLAN

### INTRODUCTION

This *General Management Plan / Environmental Impact Statement* presents the management philosophy and establishes the framework for long-term decision making at Guadalupe Mountains National Park. It is intended to guide the actions of the National Park Service (NPS) with regard to the park for a 20-year period.

Key regulations and guidance documents that were used in preparing this plan and environmental impact statement included the following:

- “Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act” (Council on Environmental Quality 1978)
- *Director’s Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a)
- *Management Policies 2006* (NPS 2006b)
- *Program Standards for Park Planning* (NPS 2004)
- *Director’s Order 41: Wilderness Preservation and Management* (NPS 1999b)

This plan and environmental impact statement present and analyze four alternatives for the future management and use of Guadalupe Mountains National Park. One of the alternatives has been identified as the NPS’ preferred alternative. In accordance with regulations and policies, the potential environmental impacts of all alternatives have been identified and assessed and have been documented in this plan.

### BRIEF HISTORY AND DESCRIPTION OF THE PARK

Guadalupe Mountains National Park was authorized by an act of Congress (Public

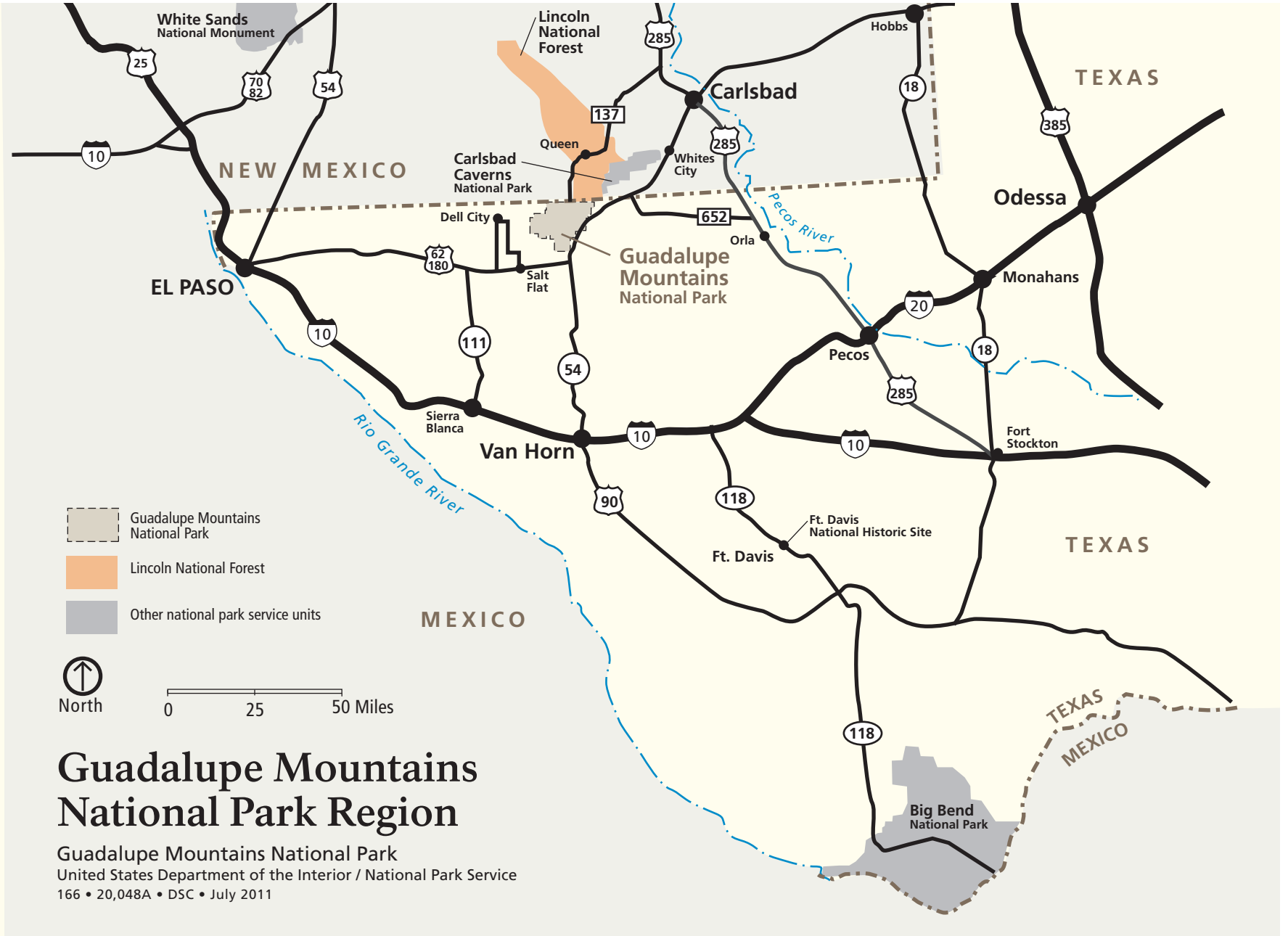
Law 89-667) in 1966. The stated goal was to preserve “an area possessing outstanding geological values together with scenic and other natural values of great significance.” A copy of this act and other legislation relating to Guadalupe Mountains National Park is provided in appendix A. The park, with 76,293 acres, was formally established in 1972.

In 1978, 46,850 acres of the park’s backcountry were formally designated by Congress as wilderness. This action was authorized by Public Law 95-625, the National Parks and Recreation Act of 1978.

On October 28, 1988, Congress passed legislation (Public Law 100-541, 102 Stat. 2720) that enlarged the park by 10,123 acres. The new land included gypsum and quartzose dunes in an area west of and adjacent to the park boundary. Land acquisition was completed in conformance with the park’s *Land Protection Plan* (NPS 1992).

All of the land identified in the 1988 legislation was deeded to the National Park Service. Additionally, 226 acres owned by The Nature Conservancy were transferred to the National Park Service.

Today, Guadalupe Mountains National Park includes 86,416 acres in west Texas, just south of the New Mexico border and north of U.S. Highway 62/180. Highway 62/180 is a major tourist thoroughfare and scenic corridor that passes through the southeast corner of the park. As shown on the Guadalupe Mountains National Park Region map, the park is about 110 miles east of El Paso and 55 miles southwest of Carlsbad, New Mexico. The nearest lodging, food, and gasoline are available at Whites City, New Mexico, about 35 miles northeast of the park on U.S. Highway 62/180.



# Guadalupe Mountains National Park Region

Guadalupe Mountains National Park  
United States Department of the Interior / National Park Service  
166 • 20,048A • DSC • July 2011

The “Park Existing Conditions” map shows park features. The park’s main visitor center is at Pine Springs. Camping is permitted year-round at Pine Springs and Dog Canyon, plus there are 10 backcountry campgrounds (no water). Developed picnic areas are available at Pine Springs, Dog Canyon, McKittrick Canyon, and Frijole Ranch. More than 82 miles of hiking trails range from easy to difficult and offer a wide range of opportunities for exploring.

The Guadalupe Mountains rise more than 3,000 feet from the arid Chihuahuan Desert that surrounds them. El Capitan, the park’s most striking feature, is a 1,000-foot-high limestone cliff. Nearby Guadalupe Peak, at 8,749 feet above sea level, is the highest point in Texas.

The Guadalupe Mountains are part of a 400-mile-long, horseshoe-shaped, fossilized reef formation, called the Capitan Reef, which extends through a large area of west Texas and southeastern New Mexico. Most of the reef formation is buried. The longest exposed stretch of the Capitan Reef extends from Guadalupe Mountains National Park northeast nearly to the city of Carlsbad, New Mexico. This 250-million-year-old formation is one of the world's finest examples of an ancient marine fossil reef. The reef’s fossil-bearing strata are also associated with the rich “oil patch” of west Texas.

Three internationally significant geological stratotype sections are found in the park. Stratotypes are outstanding examples of exposed rock that represent a certain period of geologic time. Information on the stratotypes is provided in the “Geologic Resources” section in Chapter 3: Affected Environment.

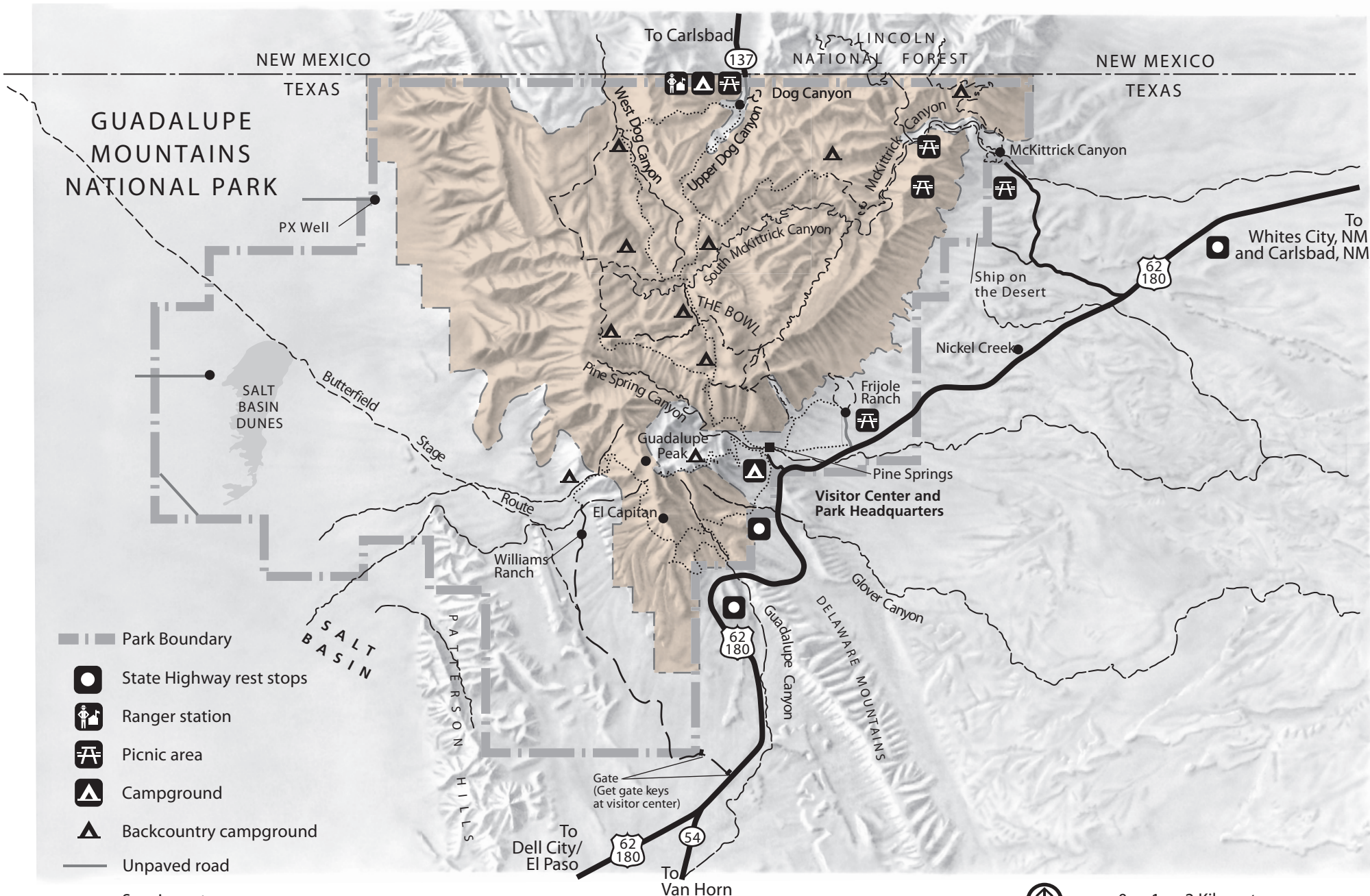
The Guadalupe Mountains have a cultural history that includes native peoples and successive waves of explorers, travelers, and immigrants. Although Spanish explorers passed through the area in 1692, the arid desert and remote highlands of the Guadalupe Mountains were the domain of native Mescalero Apache people until the mid-1800s. Gradually, explorers and pioneers entered the area and navigated by the distinctive landmark of the Guadalupe. The Butterfield Stagecoach began carrying mail and passengers through the Guadalupe Mountains on the nation’s first trans-continental mail route in 1858.

Settlers developed ranches around the Guadalupe Mountains in the mid-1800s, leading to periodic conflicts with the Mescaleros. During the Army’s military campaign against the Mescaleros, the high country of the Guadalupe Mountains became one of the Mescaleros’ last sanctuaries. By 1880, the majority of the Mescaleros were no longer occupying the Guadalupe Mountains region.

Subsequent years brought more ranchers to the area. In the 1920s and 1930s, J.C. Hunter consolidated the ranches into one large holding. Hunter built structures and an extensive livestock-watering system that pumped spring water from the southeast lowlands to the high country.

Wallace Pratt, a petroleum geologist who was charmed by the Guadalupe Mountains, bought land in McKittrick Canyon in the 1930s and built two residences that still remain. In 1959, Pratt donated his land to the National Park Service. Adjacent lands owned by Hunter and others were eventually purchased and combined into the new Guadalupe Mountains National Park.





## Park Existing Conditions

### Guadalupe Mountains National Park

United States Department of the Interior / National Park Service  
166 • 20,047A • DSC • July 2011



## **PURPOSE OF THE PLAN**

The approved general management plan will be the basic document for managing Guadalupe Mountains National Park for the next 15 to 20 years. The purposes of this general management plan are as follows:

- Confirm the purpose, significance, and special mandates of Guadalupe Mountains National Park.
- Clearly define resource conditions and visitor uses and experiences to be achieved in the park.
- Provide a framework for park managers to use when making decisions about what kinds of facilities, if any, to develop in or near the park and how to best protect park resources, provide quality visitor uses and experiences, and manage visitor use.
- Ensure that this foundation for decision making has been developed in consultation with interested members of the public and adopted by the NPS leadership after an adequate analysis of the benefits, impacts, and economic costs of alternative courses of action.

The Organic Act (16 *United States Code*, Section 1) is the legislation that established the National Park Service in 1916. The Organic Act provides the fundamental management guidance for all units of the national park system, including Guadalupe Mountains National Park. All management of this park also must conform to the park's establishing legislation and to the other federal laws, agency regulations, and policies. This plan proposes a set of actions that will help the park reach future management conditions that are consistent with this body of federal and policy requirements, as described in table 1.

## **NEED FOR THE PLAN**

The last comprehensive planning effort for Guadalupe Mountains National Park was its 1976 master plan (NPS 1976). Much has changed since then. Examples include the

- evolution of patterns and types of visitor use
- Congressional designation of part of the park as wilderness
- 1988 addition of lands to the national park

Each of these changes has major implications for how visitors access and use Guadalupe Mountains National Park and the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations. Therefore, a general management plan is needed to establish goals for the next 15 or 20 years and to broadly define how those goals will be achieved.

This plan also is needed to meet the requirements of the National Parks and Recreation Act of 1978 and NPS policy. Both mandate the development of a general management plan for each unit in the national park system.

Following distribution of the *General Management Plan / Environmental Impact Statement* and a 30-day no-action period, a record of decision approving a final plan will be signed by the NPS regional director. The record of decision documents the NPS selection of an alternative for implementation. The plan can then be implemented.

**Table 1: Conditions to Be Achieved at Guadalupe Mountains National Park  
Based on Servicewide Mandates and Policies**

Topic	Conditions to Be Achieved at Guadalupe Mountains National Park
Relations with private and public organizations, owners of adjacent land, and governmental agencies	<p>The park is managed as part of a greater ecological, social, economic, and cultural system.</p> <p>Good relations are maintained with adjacent landowners, surrounding communities, and private and public groups that affect, and are affected by, the park. The park is managed to resolve external issues and concerns and to ensure that park values are not compromised.</p> <p>Because the park is an integral part of a larger regional environment, the National Park Service works cooperatively with others to anticipate, avoid, and resolve potential conflicts, protect park resources, and address mutual interests in the quality of life for community residents. Regional cooperation involves federal, state, and local agencies, American Indian tribes, neighboring landowners, and all other concerned parties.</p>
Government-to-government relations between American Indian Tribes and Guadalupe Mountains National Park	The National Park Service and tribes culturally affiliated with the park maintain positive, productive, government-to-government relationships. Park managers and staff respect the viewpoints and needs of the tribes, continue to promptly address conflicts that occur, and consider American Indian values in park management and operation.
Natural resources: air quality	Air quality in the park meets national ambient air quality standards for criteria pollutants and protects air quality-sensitive resources. Natural visibility conditions exist in the park and scenic views of the landscape are not impaired by human activities.
Natural resources: backcountry	Backcountry use is managed in accordance with a backcountry management plan (or other plan addressing backcountry uses) that is designed to avoid unacceptable impacts on park resources or adverse effects on visitor enjoyment of appropriate recreational experiences. The National Park Service seeks to identify acceptable limits of impacts, monitors backcountry use levels and resource conditions, and takes prompt corrective action before unacceptable impacts occur.
Natural resources: ecosystem management	The park is managed holistically, as part of a greater ecological, social, economic, and cultural system.
Natural resources: exotic species	The management of populations of exotic plant and animal species, up to and including eradication, is undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.
Natural resources: fire management	<p>Park fire management programs are designed to meet resource management objectives prescribed for the various areas of the park and to ensure that the safety of firefighters and the public are not compromised.</p> <p>All wildland fires are effectively managed using the appropriate management strategy, including fire use, considering resource values to be protected and firefighter and public safety, using the full range of strategic and tactical operations as described in an approved fire management plan.</p>
Natural resources: floodplains	<p>Natural floodplain values are preserved or restored. Long- and short-term environmental effects associated with the occupancy and modification of floodplains are avoided. When it is not practicable to locate or relocate development or inappropriate human activities to a site outside the floodplain or where the floodplain will be affected, the National Park Service</p> <ul style="list-style-type: none"> <li>• prepares and approves a statement of findings in accordance with Director's Order 77-2.</li> <li>• uses nonstructural measures as much as practicable to reduce hazards to human life and property while minimizing impacts on the natural resources of floodplains.</li> <li>• ensures that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 <i>Code of Federal Regulations</i> 60).</li> </ul>

Topic	Conditions to Be Achieved at Guadalupe Mountains National Park
Natural resources: general natural resources / restoration	Native species populations that have been severely reduced in or extirpated from the park are restored where feasible and sustainable. Populations of native plant and animal species function in as natural condition as possible except where special considerations are warranted.
Natural resources: geologic resources	The park's geologic resources are preserved and protected as integral components of the park's natural systems. Caves and karst are managed in accordance with approved cave management plans to perpetuate the natural systems associated with the caves and karst.
Natural resources: land protection	Land protection plans are prepared to determine and publicly document what lands or interests in land need to be in public ownership, and what means of protection are available to achieve the purposes for which the park was created.
Natural resources: lightscape management and night sky	Excellent opportunities to see the night sky continue to be available. Artificial light sources both within and outside the park do not unacceptably adversely affect opportunities to see the night sky.
Natural resources: native vegetation and animals	All native plants and animals in the park are maintained as part of the natural ecosystem.
Natural resources: natural soundscapes	The National Park Service preserves the natural ambient soundscapes, restores degraded soundscapes to the natural ambient condition wherever possible, and protects natural soundscapes from degradation resulting from human-caused noise. Disruptions from recreational uses are managed to provide a high-quality visitor experience and minimize disturbance to wildlife that is consistent with the goal to preserve or restore the natural quiet and natural sounds.
Natural resources: paleontological resources	Paleontological resources, including both organic and mineralized remains in body or trace form, are protected, preserved, and managed for public education, interpretation, and scientific research.
Natural resources: soils	The National Park Service actively seeks to understand and preserve the soil resources of the park, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources. Natural soil resources and processes function in as natural a condition as possible, except where special considerations are allowable under policy.
Natural resources: threatened and endangered species	Federal and state-listed threatened and endangered species and their habitats are protected and sustained. Native threatened and endangered species populations that have been severely reduced in or extirpated from the park are restored where feasible and sustainable.
Natural resources: water resources	Surface water and groundwater are protected and water quality meets or exceeds all applicable water quality standards. Programs and facilities are maintained and operated to avoid pollution of surface water and groundwater. Watersheds are managed as complete hydrologic systems. This includes minimizing human-caused disturbance to the natural upland processes that deliver water, sediment, and woody debris to streams. Natural fluvial processes are allowed to proceed unimpeded, and stream processes that create habitat features are protected. Where stream manipulation is unavoidable, maximum use is made of techniques that are visually unobtrusive and that protect natural processes.
Natural resources: wetlands	The natural and beneficial values of wetlands are preserved and enhanced. A "no net loss of wetlands" policy is implemented, with an associated goal of net gain of wetlands through the restoration of previously degraded wetlands. The destruction or modification of wetlands is avoided. New construction in wetlands does not occur wherever there is a practicable alternative. The National Park Service compensates for unavoidable adverse impacts on wetlands by restoring wetlands that have been previously degraded.

Topic	Conditions to Be Achieved at Guadalupe Mountains National Park
Natural resources: wilderness	Wilderness characteristics and values are retained and protected. Visitors continue to find opportunities for solitude and primitive, unconfined recreation. Signs of people remain substantially unnoticeable.
Cultural resources: archeological resources	<p>Archeological sites are identified and inventoried, and their eligibility for listing in the National Register of Historic Places determined and documented. The qualities that contribute to the listing or eligibility for listing are protected in accordance with the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (Secretary of the Interior 1983) (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).</p> <p>Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. In such cases, the site is mitigated and professionally documented and excavated for data recovery. The resulting artifacts, materials, and records are curated and conserved in the park's museum collections and archives. Concurrence for mitigation is in consultation with the Texas state historic preservation officer (and American Indian tribes, if applicable). Some archeological sites that can be adequately protected may be interpreted to the visitor.</p>
Cultural resources: historic structures	Historic structures are inventoried and their integrity and eligibility are evaluated under National Register of Historic Places criteria. The qualities that contribute to the listing or eligibility for listing of historic structures in the National Register of Historic Places are protected in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings (Secretary of the Interior 1995a) (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).
Cultural resources: ethnographic resources	<p>Appropriate cultural anthropological research is conducted in cooperation with groups associated with the park.</p> <p>The National Park Service accommodates access to and ceremonial use of American Indian sacred sites by American Indian religious practitioners and avoids adversely affecting the physical integrity of sacred sites.</p> <p>NPS general regulations on access to and use of natural and cultural resources in the park are applied in an informed, balanced manner that is consistent with park purposes, does not unreasonably interfere with American Indian use of traditional areas or sacred resources, and does not result in the degradation of park resources.</p> <p>American Indians and other individuals and groups linked by ties of kinship or culture to ethnically identifiable human remains, sacred objects, objects of cultural patrimony, and associated funerary objects are consulted when such items may be disturbed or are encountered on park lands.</p> <p>All ethnographic resources listed in the National Register of Historic Places or determined eligible for listing are called traditional cultural properties and are protected through tribal consultation. If disturbance of such resources is unavoidable, formal consultation with the Texas historic preservation officer and the Advisory Council for Historic Preservation, if necessary, and as appropriate with American Indian tribes, is conducted.</p>
Cultural resources: ethnographic resources (continued)	<p>The April 29, 1994, Presidential memorandum on "Government-to-Government Relations with Native American Tribal Governments," codified at 3 Code of Federal Regulations 1007 (1995), states in part, "Each executive department and agency shall consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments before taking actions that affect federally recognized tribal governments. All such consultations are to be open and candid so that all interested parties may evaluate for themselves the potential impact of relevant proposals." Section 5.2.1 of Management Policies 2006 (NPS 2006b) states in part that "traditionally associated peoples should be consulted about ... proposed NPS actions that may affect the treatment of, use of, and access to cultural and natural resources with known or potential cultural meaning for the groups."</p> <p>The identities of community consultants and information about sacred and other culturally sensitive places and practices will be kept confidential when research agreements or other circumstances warrant.</p>

Topic	Conditions to Be Achieved at Guadalupe Mountains National Park
Cultural resources: cultural landscapes	<p>Cultural landscape inventories are conducted to identify landscapes potentially eligible for listing in the National Register of Historic Places, and to assist in future management decisions for landscapes and associated cultural and natural resources.</p> <p>The management of cultural landscapes focuses on preserving the physical attributes, biotic systems, and use when that use contributes to their historical significance.</p> <p>The preservation, rehabilitation, restoration, or reconstruction of cultural landscapes is undertaken in accordance with The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (Secretary of the Interior 1995b).</p>
Cultural resources: museum collections	<p>All museum collections (objects, artifacts, specimens, and manuscript collections) are identified and inventoried, catalogued, documented, preserved, and protected. Provision is made for access to and use of items in the collections for exhibits, research, and interpretation.</p> <p>The qualities that contribute to the significance of collections are protected in accordance with established standards.</p>
Visitor use and experience: park use requirements	<p>Park resources are conserved "unimpaired" for the enjoyment of future generations.</p> <p>Visitors have opportunities for types of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the park. No activities occur that would cause derogation of the values and purposes for which the park was established.</p> <p>For all zones, districts, or other logical management divisions within the park, the types and levels of visitor use are consistent with the desired resource and visitor experience conditions prescribed for those areas.</p> <p>Park visitors have opportunities to understand and appreciate the significance of the park and its resources, and to develop a personal stewardship ethic.</p> <p>To the extent feasible, programs, services, and facilities in the park are accessible to and usable by all people, including those with disabilities.</p>
Visitor use and experience: commercial services	<p>All commercial services are authorized, are necessary and appropriate, and are economically feasible. Appropriate planning is done to support commercial services authorization.</p>
Visitor use and experience: public health and safety	<p>Within the constraints of the Organic Act to not impair resources, and any other limitations on capability, the National Park Service and its concessioners, contractors, and cooperators seek to provide a safe and healthful environment for visitors and employees.</p> <p>The park staff strives to identify recognizable threats to safety and health and to protect property by applying nationally accepted standards. Consistent with mandates and the prohibition on effects, the park staff will reduce or remove known hazards and/or apply appropriate mitigation measures, such as closures, guarding, gating, education, and other actions.</p>
Other topics: sustainable design and development	<p>Visitor management facilities are harmonious with park resources, compatible with natural processes, aesthetically pleasing, functional, as accessible as possible to all segments of the population, energy-efficient, and cost-effective.</p> <p>All decisions regarding park operations, facilities management, and development in the park, from the initial concept through design and construction through operation and maintenance, reflect principles of resource conservation. Thus, all park developments and park operations are sustainable to the maximum degree possible and practical. New developments and existing facilities are located, built, and modified according to the Guiding Principles of Sustainable Design (NPS 1993) or other similar guidelines.</p> <p>Management decision making and activities throughout the park use value analysis, which is mandatory for all Department of the Interior bureaus, to help achieve this goal. Value planning, also called value analysis, value engineering, and value management, is used when value methods are applied on general management and lower-tier planning activities.</p>

Topic	Conditions to Be Achieved at Guadalupe Mountains National Park
Other topics: transportation to and within the park	<p>Visitors have reasonable access to the park. Connections exist from the park to regional transportation systems, as appropriate.</p> <p>Transportation facilities in the park provide access for the protection, use, and enjoyment of park resources. They preserve the integrity of the surroundings, respect ecological processes, protect park resources, and provide high visual quality and a rewarding visitor experience.</p> <p>The National Park Service participates in all transportation planning forums that may result in links to the parks or impacts on park resources. This may involve working with federal, tribal, state, and local agencies on transportation issues to address park access and transportation connectivity.</p>
Other topics: utilities and communication facilities	<p>Park resources or public enjoyment of the park are not denigrated by nonconforming uses. Telecommunication structures do not jeopardize the park's mission and resources. No new nonconforming use or rights-of-way are permitted through the park without specific statutory authority and approval by the director of the National Park Service or his representative, and are permitted only if there is no practicable alternative to such use of NPS lands.</p>

## **IMPLEMENTATION OF THE PLAN**

Full implementation of the approved plan is anticipated within the 20-year life span of the plan. Although some aspects of the approved plan may begin immediately, others, such as new facility development, will depend on future funding availability. It should be understood that the approval of the plan does not guarantee that the funding and staff needed for plan implementation will be available.

Additional studies and more detailed implementation planning, design, and environmental compliance frequently are required before proposed actions can be carried out. These steps often involve consultation with interested members of the public. In addition, specific actions may be required to achieve desired conditions and long-term goals. For example

- Construction planning, design, and environmental compliance, including project-specific National Environmental Policy Act document preparation, would be completed before new facilities were developed.
- Appropriate permits would be obtained before implementing actions that would impact wetlands.
- Appropriate federal and state agencies would be consulted concerning actions that could affect a threatened or endangered species.
- All actions that could affect historic structures or historic ranching elements would include consultation with the state historic preservation officer.
- American Indian tribes and the state historic preservation office would be consulted regarding actions that could affect prehistoric archeological sites.



**Western Escarpment from Dunes**



## FOUNDATION FOR PLANNING AND MANAGEMENT

### LEGISLATIVE INTENT

Public Law 89-667, passed October 15, 1966, authorized the establishment of Guadalupe Mountains National Park “to preserve in public ownership an area in the State of Texas possessing outstanding geological values together with scenic and other natural values of great significance.” Formal establishment of the park, with a size of 76,293 acres, occurred on September 30, 1972.

Congress formally designated 46,850 acres of Guadalupe Mountains National Park as wilderness in 1978. Based on the Wilderness Act of 1964, the intent of this action was to create within the park “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.”

Expansion of the park’s boundary occurred on October 28, 1988 (Public Law 100-541, 102 Stat. 2720) with the addition of 10,123 acres on the west side of the park. This area is scientifically important for its

- plant associations (possessing a representative segment of Chihuahuan Desert)
- rare plant species
- white gypsum and red quartzose dunes and associated ancient lakebed
- archeological resources

These laws, which are included in appendix A, show the legislative intent for the park. They are the basis for the purpose, significance, mission statements, and management goals identified in this plan.

### PARK PURPOSE

National park purpose statements reaffirm the reasons for which the national park was set aside as a unit of the national park system and provide the foundation for national park

management and use. The purposes of Guadalupe Mountains National Park are as follows:

1. To preserve an area possessing outstanding, globally unique geological features together with scenic, natural, and cultural values of great significance.
2. To manage a designated wilderness area where the earth and its community of life are untrammelled, and where humans are visitors who do not remain.
3. To provide opportunities for visitors to understand, enjoy, appreciate, and experience the unique nature of the park.
4. To provide educational and research opportunities that enhance stewardship and wider understanding of resources.

### PARK SIGNIFICANCE

National park significance statements capture the essence of the national park’s importance to our country’s natural and cultural heritage. Significance statements do not inventory national park resources, but instead answer questions such as

- Why are Guadalupe Mountains National Park’s resources distinctive?
- What do they contribute to our natural or cultural heritage?

Defining a national park’s significance helps managers make decisions that preserve the resources and values necessary to accomplish that park’s purpose. The significance of Guadalupe Mountains National Park is as follows.

1. Guadalupe Mountains National Park is situated at the western terminus of the world’s most extensive and well-exposed fossil reef, including related shelf and basinal rocks, which have achieved international designation as the

world's best example of Middle Permian geology.

- a) A tremendous earth fault on the west side of the park attracts major geological interest because it exposes numerous classical depositional settings superimposed over a long interval of geologic time.
  - b) The western area of the park contains excellent examples of playa depositional systems, including evaporite minerals, salt lake shorelines, and areas of aeolian dunes.
2. Stark contrasts between mountains and desert, overwhelming vistas stretching as far as the eye can see, brilliant fall colors created by the unusually plentiful vegetation, deep rock-ribbed canyons and sparkling white dunes contribute to the extraordinary scenic beauty of the Guadalupe.
  3. Rugged and windswept, the Guadalupe Mountains' wilderness provides opportunities to experience the unaltered dynamic of life in a remote landscape resplendent in its isolated beauty and inspirational solitude.
  4. Guadalupe Mountains National Park is an island within an arid sea where an interface of Chihuahuan Desert, Rocky Mountain, and Great Plains flora and fauna was isolated by environmental changes. It contains relict and endemic montane, canyon, and aquatic species in a delicate balance created by elements of physical geography, latitude, climate, and hydrology.
  5. The cultural resources of the Guadalupe reflect the continuous association of peoples characterized by spiritual connections and adaptations to a dynamic environment.

## PARK MISSION

The mission for the park is a visionary statement that conveys the essence of the park qualities to be protected and understood. Fulfillment of this mission reinforces a bond between people and their natural and cultural heritage.

*Guadalupe Mountains National Park is dedicated to the preservation of outstanding geological, scenic, cultural, and other natural values, in a place of untrammelled wilderness, where man does not remain. The park is committed to safeguarding these resources for the inspiration, education, and enjoyment of the American public and the world.*

## PARK VISION

The Guadalupe Mountains are globally unique geologic resources with a rich history of human interaction that will be managed as wilderness and adjacent wildlands with opportunities for scientific study, visitor experience and education consistent with resource preservation, ecosystem management, and the park's rugged character.

## PRIMARY INTERPRETIVE THEMES

Primary interpretive themes are the most important stories, concepts, and ideas about the park that will be communicated to the public. These themes are intended to be the basis of intellectual and emotional connections with park resources that will contribute to a more meaningful experience for visitors.

### Geology

Guadalupe Mountains National Park preserves the heart and western terminus of the Capitan Reef, a limestone fossil reef that contains the world's best example of Middle Permian geological formations. The reef formations are highly exposed and, thus, have extraordinary scenic and scientific value.

### Ecological Communities

Four major ecological communities, including montane forest, desert, southern plains, and riparian canyon, overlap here. Diverse plants and animals exist largely because of physical geography, latitude, climate, and hydrologic processes, including relict and endemic species isolated by environmental change.



Brachiopods

### Environmental Protection

Park environmental communities are inseparable from surrounding areas; the health and survival of related natural and human communities are linked in complex and shifting relationships. Issues such as air pollution, habitat loss, acid rain, and decreasing biodiversity affect and concern park visitors and neighbors. Park resource management and the park's interpretation and education programs seek to preserve diverse, sustainable communities.

### Cultural History

The park preserves remnants from thousands of years of human occupation and activities, including American Indian, Spanish, African-American, and Anglo-

American exploration, settlement, transportation, and trade. Scientific research and oral traditions document diverse livelihoods, stewardship practices, adaptations, and spiritual connections to the environment and offer invaluable perspectives to inform contemporary management choices.

### Wilderness

Much of the park is designated wilderness, which is managed to retain its primeval character and natural conditions. This wilderness provides a foundation for healthy, diverse ecosystems and offers humans opportunities for reflection, challenge, research, respite, and renewal.

### DESIRED CONDITIONS FOR PARK MANAGEMENT

Management goals for Guadalupe Mountains National Park that will be addressed by the general management plan alternatives were developed for resource protection, visitor experience, and operational effectiveness. These goals are consistent with requirements of the Government Performance and Results Act of 1993.

#### Preserve Park Resources

- The ecologic balance and biodiversity of the park's natural resources are protected, restored, and maintained.
- The park's cultural resources are preserved, stabilized, and protected.
- The nonrenewable geological and paleontological resources are protected, conserved, and maintained.
- The park's designated wilderness and all other identified backcountry lands will be managed and maintained as wilderness.
- Management decisions and interpretation are based on sound research, scientific information, resource databases, and best management practices.

- Scenic vistas from within and outside the park boundaries are protected from significant intrusions.

#### **Provide for Public Understanding and Experience of Park Resources**

- Guadalupe Mountains National Park visitors will have the opportunity to learn the information necessary for a safe, enjoyable visit and to gain an understanding and appreciation of the park's cultural and natural resources.
- Guadalupe Mountains National Park visitors will have safe and appropriate facilities and services, including educational and recreational opportunities, which address their needs, regardless of the length of stay.

#### **Ensure Organizational Effectiveness**

- The work environment promotes employee development, productivity, creativity, trust, safety, and wellbeing. The park staff works together as an efficient, effective team to achieve park goals and objectives.
- Adequate resources, including infrastructure, staffing, and budget are available to adequately operate, maintain, and protect the park.
- Cooperative relationships and partnerships with surrounding local communities, agencies, and organizations support mutual goals without compromising the integrity of the park's natural, cultural, or scenic resources.
- Park stakeholders, partners, cooperators, and neighbors contribute to the decision-making process that guides effective management of the park's resources.
- Guadalupe Mountains National Park is an effective, cooperative partner in the stewardship of natural and cultural resources beyond the park's boundaries.

## **RESEARCH OPPORTUNITIES**

The park's natural and cultural resources offer invaluable opportunities for research in a variety of disciplines. These include, but may not be limited to, geology, paleontology, biology, ecology, history, archeology, ethnography, and anthropology.

## **SPECIAL MANDATES AND ADMINISTRATIVE COMMITMENTS**

Special mandates and administrative commitments refer to park-specific requirements. These formal agreements are often established concurrently with the creation of a unit of the national park system. Guadalupe Mountains National Park does not have any special mandates or administrative commitments.

## **SERVICEWIDE MANDATES AND POLICIES**

This section identifies what must be done at Guadalupe Mountains National Park to comply with federal laws and with the policies of the National Park Service. These are the measures that the National Park Service must meet, regardless of the alternative selected for the long-term management of the park. Examples of servicewide mandates and policies include

- federal legislation, such as the Endangered Species Act, National Historic Preservation Act, and Americans with Disabilities Act
- executive orders, such as those relating to wetlands (No. 11990), Indian sacred sites (No. 13007), and environmental justice (No. 12898)
- the policies of the National Park Service that are presented in director's orders and related documents and are available on the Internet at <http://home.nps.gov/applications/npspolicy/DOrders.cfm>

Many of the laws and executive orders that guide national park management, with their

legal citations, are identified in appendix B. Most are applicable throughout the nation, such as requirements for clean air and clean water, protection of resources such as wetlands and migratory birds, and access opportunities for individuals with impaired mobility.

Some of the laws are applicable solely or primarily to units of the national park system. These include the 1916 Organic Act that created the National Park Service, the General Authorities Act of 1970, the act of March 27, 1978 relating to the management of the national park system, and the 1998 National Parks Omnibus Management Act.

The NPS Organic Act (16 *United States Code* Chapter 1, Subchapter I, Section 1) provides the fundamental management direction for all units of the national park system. The National Park Service is required to

*promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measure as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*

The National Park System General Authorities Act (16 *United States Code* Chapter 1, Subchapter I, Section 1a-1 *et sequens*) affirms that while all national park system units remain “distinct in character,” they are “united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage.” The act makes it clear that the NPS Organic Act and other

protective mandates apply equally to all units of the system. Further, amendments state that NPS management of park units should not result “in derogation of the purposes and values for which the Park was established.”

The NPS mission is based on the Organic Act and other legislation. It states

*The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.*

### **Achieving Servicewide Mandates and Policies**

Even under the alternative of no action / continue current management, the National Park Service must meet all servicewide mandates and policies. Therefore, the alternatives in this plan focus primarily on the desired conditions that are *not* included in servicewide mandates and policies.

Table 1 summarizes the conditions that must be achieved at Guadalupe Mountains National Park, based on servicewide mandates and policies. Appendix C expands on this information by citing the sources of law or policy and giving examples of the types of actions being pursued by NPS staff. Revisions and updates to the NPS’ management policies and director’s orders will supersede some of those referenced here. Continuing compliance with revisions to these directives will ensure that this general management plan will remain applicable throughout its intended life.

## **RELATIONSHIP OF OTHER RESOURCE PLANNING AND MANAGEMENT TO THIS GENERAL MANAGEMENT PLAN**

Guadalupe Mountains National Park is in Culberson and Hudspeth Counties in west Texas. Most properties surrounding the park are privately owned and are used for agricultural and residential purposes. The Lincoln National Forest is adjacent to part of the park's northern border, and there is Bureau of Land Management property to the northwest and northeast. Both the states of Texas and New Mexico own parcels of land adjacent to or near the park boundary, and the state of Texas owns the lands associated with U.S. Hwy 62/180. There are no tribal lands nearby.

The Lands with High Resource Values map identifies land within and outside Guadalupe Mountains National Park that are important nationally or even internationally for their geologic resources or scenic landscape features. As shown on the map, many of these resources are outside the park boundaries, which primarily follow the boundaries of the original Guadalupe Mountain Ranch. Many of these features contribute to the unique qualities of the park and the enjoyment of visitors. Also, land uses outside the park boundary could impact park resources and values. As a result, the National Park Service needs to work cooperatively with surrounding private and public landowners to protect resource and scenic values.

Several plans and/or management actions could affect or would be influenced by the approved general management plan for Guadalupe Mountains National Park. These plans and actions are associated with multiple governmental jurisdictions and private interests surrounding the park. Planning and other management actions and

their relationship to Guadalupe Mountains National Park are described briefly here.

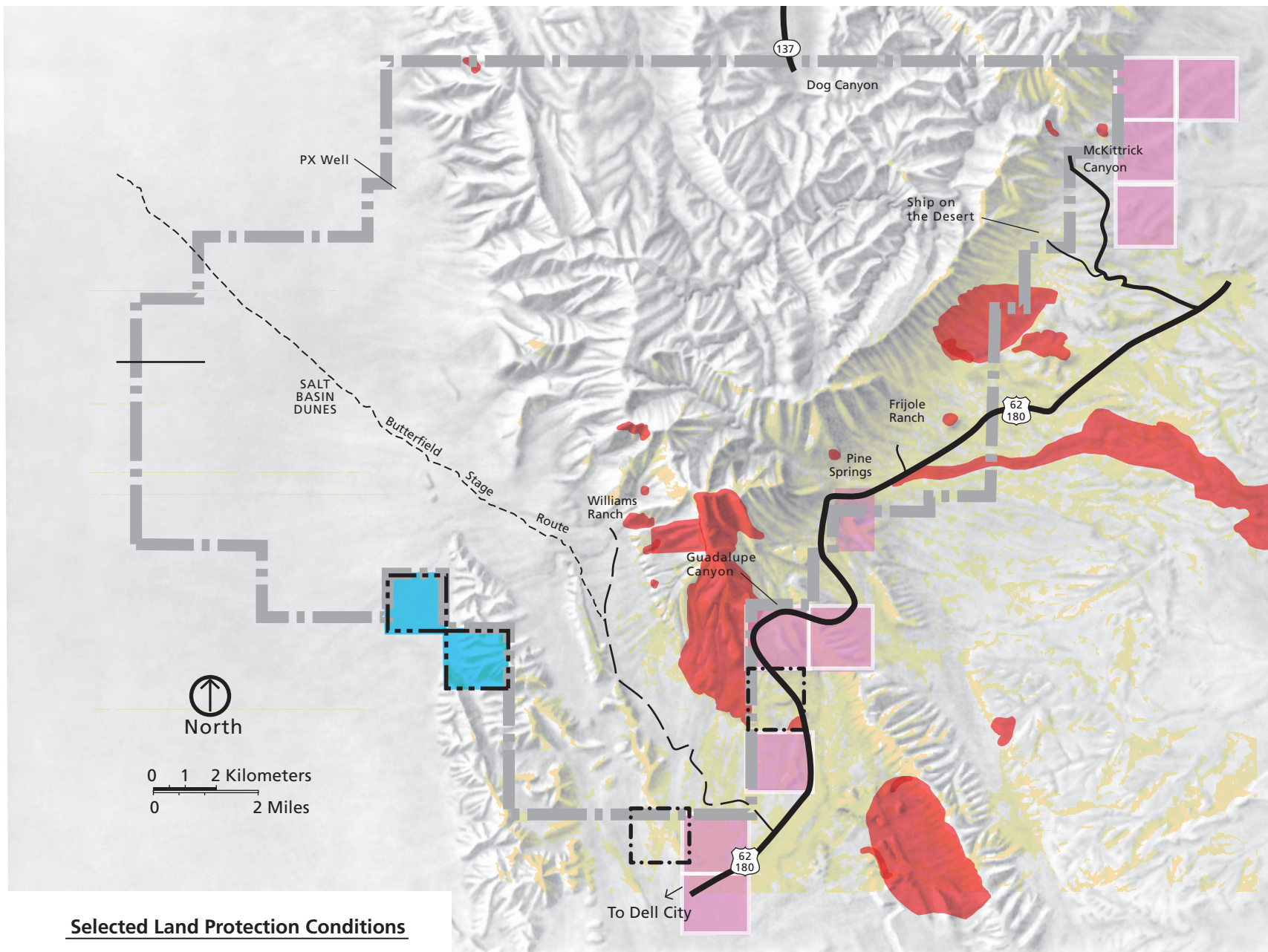
### **LOCAL JURISDICTIONS**

Neighboring local jurisdictions have adopted dark sky ordinances that will help protect the regional visibility of the night sky. The National Park Service will continue to implement dark sky protection measures within the park and will work with local jurisdictions on measures that encourage the control of night lighting.








Local planning in Dell City and Queen could encourage development through such actions as extending city utility services. However, as described in "The Socioeconomic Environment" in Chapter 3, only limited growth is expected in the populations of the counties that contain these communities between now and 2020. No current local planning is in conflict with park planning.

### **COUNTY JURISDICTIONS**

Guadalupe Mountains National Park lies within the Texas counties of Culberson and Hudspeth and adjoins Eddy and Otero Counties in New Mexico. The governments of these counties could affect the park through a variety of regulations and policies, such as those regarding land use, roads, night skies, and service improvements. Texas counties do not have zoning authority, and no current county planning is in conflict with the park management recommendations in this plan.



### Selected Land Protection Conditions

- |   |  |   |                              |
|---|--|---|------------------------------|
|  | Scenic Easement (existing)                         |  | Scenic Route / State Highway |
|  | Miscellaneous Geological Resources within Sections |  | Private Land                 |
|  | Areas Visible from Highway                         |  | Park Boundary                |
|  | Geologic Stratigraphic Type Sections               |   |                              |

## Lands with High Resource Values

Guadalupe Mountains National Park

United States Department of the Interior / National Park Service

166 • 20,054A • DSC • July 2011



The rapidly growing metropolitan area associated with El Paso is expanding eastward, and has the potential to influence diverse aspects of the park, including dark skies, visitor numbers and expectations, and transportation. The National Park Service will continue to work with Hudspeth County on growth-related issues that could affect Guadalupe Mountains National Park. Although Otero County is adjacent to the park's north boundary, the lands next to the park are under federal jurisdiction and will not be further analyzed in this document.

### **SPECIAL DISTRICTS**

Groundwater in the area is managed by the Culberson County Groundwater Conservation District and the Hudspeth County Underground Water Conservation District 1. These agencies could affect groundwater quality and quantity outside and within the park by decisions and policies on groundwater pumping for agricultural and other uses, such as export to urban areas.

The Texas Legislature, in Senate Bill 1, established regional water planning groups to address regional issues regarding water quality and quantity. The park is within the Far West Texas Regional Water Planning Group, which will be developing regional plans on water management into the future.

The Rio Grande Council of Governments develops policies and plans regarding regional land use planning, growth, economic development, and services. Plans and policies of this group could affect the air, water, and scenic resources within and near the park, and also could influence socioeconomic and transportation issues.

### **PRIVATE ENTITIES**

Much of the land around Guadalupe Mountains National Park is privately owned. Therefore, the National Park Service must

work with private landowners to advance its goals while ensuring that the property rights of its neighbors are protected. Cooperative actions of the National Park Service with private entities that relate to the future of the park include the following.

- The National Park Service will continue to collaborate with surrounding landowners to negotiate preservation agreements, and to acquire (through willing sellers) or accept donation of lands considered critical to protecting important park-related resources from incompatible uses. These include, but are not limited to, paleontological sites and significant habitat for important species of plants and animals.
- As they become available from willing sellers or through donation, the National Park Service will seek to acquire or accept donation of lands considered critical to protecting the scenic integrity of adjacent park-related resources, including scenic landscape features.
- The National Park Service will seek agreements with landowners, including the subdivisions along the park boundary, to protect the scenic resources of the park, including vistas of the park from highways and other locations outside the park boundary. These agreements could include development of partnerships and acquisition of land rights to protect important viewsheds both within and adjacent to the park. Among other areas, the National Park Service would like to work with landowners to protect views of the salt flats.
- The National Park Service will seek agreements with landowners to provide protection for important geologic resources outside the park boundaries. These include the Getaway member of the Cherry Canyon Formation (a type locality for several fossil species) and the Reef Trail member of the Bell Canyon Formation. Agreements could include

development of partnerships and acquisition of land rights to protect important resources.

- The National Park Service will seek to formalize access across private land at the Guadalupe Pass trailhead to provide public access to park lands and trails, including the Salt Basin Overlook Trail and El Capitan Trail.
- The National Park Service will continue to work with local governments and neighboring landowners to secure continued access to PX Well.
- The National Park Service will continue to work with oil and gas pipeline companies to mitigate impacts of pipeline transmissions through the park and to provide for public safety.
- The National Park Service will collaborate with surrounding landowners and energy developers to mitigate impacts from the construction of wind energy generation facilities in the vicinity of the park to ensure that they would not adversely impact cultural or natural resources.
- The National Park Service will continue to use signs and fencing to discourage park visitors from trespassing on private lands.

Plans and actions of private entities that could affect Guadalupe Mountains National Park include the following.

**The Nature Conservancy.** In the 1970s, the gypsum dunes in what is now the western part of Guadalupe Mountains National Park were being threatened with damage by off-road vehicle use and other trespassing. To ensure the protection of at least part of the dunes, The Nature Conservancy purchased a 226-acre area in 1980.

The Nature Conservancy lands subsequently were deeded to the Hudspeth Directive for Conservation, but a conservation easement was retained by The Nature Conservancy. A memorandum of understanding between The Nature Conservancy, Hudspeth Directive for Conservation, and National

Park Service provided for interim management of these lands.

This block of property was included in the land identified in the 1988 legislation to expand Guadalupe Mountains National Park. The land ownership transfer to the National Park Service was completed in 2011 and these lands will be assigned the same management zones as the NPS lands that surround them (see management zones for the alternatives in chapter 2).

**Blue Origin.** Blue Origin, a Seattle-based company, is developing a rocket launching facility about 30 miles south of the park. The development will launch sub-orbital rockets that enable individuals to go into space and back. Facilities will include a rocket launching and landing pad and modest support structures. Aspects of this project that could affect Guadalupe Mountains National Park include the following.

- The project will add dust and other air borne particles to the atmosphere, which might affect air quality, particularly visibility, in the park.
- The launching of rockets could create a visual and sound intrusion on the wilderness areas of the park, especially at night when it could affect the night sky and disturb the otherwise quiet wilderness environment.
- Spaceport operations might result in additional traffic, including hazardous materials, traveling through the park.
- The presence of the spaceport could attract other development to the region, with its related impacts

**Subdivisions.** Two subdivisions have been platted on the park's boundaries. The Hudspeth County subdivision is east of Dell City adjacent to the west boundary of the park near the Salt Basin Dunes. The Culberson County subdivision surrounds the south parcel of land that is owned by the NPS and that is proposed for incorporation into the park by a boundary change. Commercial entities have extended utilities,

such as telephone lines and electrical power, to these subdivisions. These subdivisions have the potential to reduce visibility by producing dust from increased vehicle traffic, and outdoor lighting could reduce the visibility of night skies in the park.

## **STATE JURISDICTIONS**

Planning decisions made in the states of Texas and New Mexico could impact park management with respect to natural and cultural resource protection and management, the development of minerals rights, and transportation. The responsibilities of key state agencies as they relate to Guadalupe Mountains National Park are summarized below.

**The Texas Commission on Environmental Quality** is the lead environmental agency responsible for protecting the state's natural resources, including air and water, and the safe management of waste. This agency works with the National Park Service on environmental concerns such as air quality, prescribed burning, water quality, and hazardous materials.

**The Texas Water Development Board** works with park, state, and regional planners on water issues. It also is the agency responsible for monitoring wells and managing water and wastewater systems to ensure compliance with public health laws.

**The Texas Historical Commission** is responsible for protecting and preserving the state's historic and prehistoric resources for use, education, enjoyment, and economic benefit. The state historic preservation officer is the executive director of the Texas Historical Commission and is responsible for formal consultation with the National Park Service under the National Historic Preservation Act.

**The Texas Department of Transportation** is responsible for Highway 62/180, which runs through and adjacent to the park. This includes providing directional signs on roads

leading to the park. Park staff work with the Texas Department of Transportation to ensure that roadside pulloffs, which provide places for visitors to enjoy many spectacular views of the park, continue to be available. Future actions of this agency could include providing additional pulloffs, if they are determined to be desirable.

**The Texas Railroad Commission** oversees the Texas oil and gas industry. This includes gas utilities, pipeline and rail safety, safety in the liquefied petroleum gas industry, and the surface mining of coal and uranium. The National Park Service works with the Texas Railroad Commission in complying with safety regulations regarding the transport and storage of propane, pipeline safety, and the management and sealing of old oil wells.

**The Texas Parks and Wildlife Department** is responsible for the management and conservation of natural and cultural resources. Activities include providing outdoor recreation, managing parks and historic areas, and managing and protecting wildlife and wildlife habitat. Agency staff members work with the National Park Service to manage wildlife, ensure that species of management concern are considered in park activities, and coordinate wildlife and wildlife habitat issues that relate to the park.

**The Texas Archeological Research Laboratory** keeps the archeological site files for the state. It assigns all site numbers for archeological sites in the park.

**The Texas Forest Service** is responsible for forest resources and wildland fire management. They coordinate local agency assistance and provide support to counties during wildland fire emergencies. At Guadalupe Mountains National Park, this agency works with the National Park Service in the coordination of the Big Tree Program and forest pest concerns, and in coordination of interagency wildland fire activities.

The **Texas General Land Office** manages state-owned lands throughout Texas, including School Board Lands, which it is charged with managing to generate revenue. This agency manages the state-owned lands adjacent to the park boundary and historically has leased them for grazing and recreational purposes, including hunting. However, Texas General Land Office is considering more intensive development that would produce higher revenues, including leasing them to corporate entities for water mining. These lands have also been considered for the installation of large, wind power generators, and the potential continues for the construction of wind farms in the Patterson Hills and between Pine Springs and Guadalupe Canyon.

The **New Mexico Department of Transportation** is responsible for the roads leading into Dog Canyon and for related park directional signs.

The **New Mexico Fish and Game Commission** is responsible for the state's wildlife and aquatic life. This agency works with the National Park Service on concerns regarding game animals and predators along the state boundary adjacent to Guadalupe Mountains National Park.

The **New Mexico Forestry Department** manages forest resources and wildland fire. This agency has agreements to work with the National Park Service on interagency wildland fire activities along the park's northern boundary. They are the lead agency in the formation of the Joint Power Operating Plan for directing interagency wildland fire activities.

## FEDERAL JURISDICTIONS

The management of Guadalupe Mountains National Park is affected by the plans and/or management actions of the following federal agencies.

Coordination with other units of the **National Park Service** is required, particularly with regard to Carlsbad Caverns

National Park. Both parks are within the greater Guadalupe Mountains ecosystem, and they share many management concerns.

The **Bureau of Land Management** manages the Carlsbad Resource Area, which adjoins the park's northeast boundary, and the Las Cruces Resource Area, along the park's northwest boundary, in New Mexico. Two wilderness study areas, including one in each resource area, are near the park boundary.

The **U. S. Forest Service's** Lincoln National Forest, Guadalupe Ranger District in New Mexico shares more than 4 miles of boundary with the park. A designated wilderness study area in the Guadalupe Ranger District is adjacent to the park boundary. Jurisdiction over the significant riparian and canyon resource of North McKittrick Canyon is shared by this agency and the National Park Service.

The **U. S. Fish and Wildlife Service** is responsible for working with the National Park Service in managing and implementing the Endangered Species Act within the park.

The **Natural Resources Conservation Service** works with the National Park Service to protect the park's soil resources.

## MULTI-AGENCY ACTIVITIES

The protection of resources such as air, water, and scenery will require cooperative action among many public and private entities. Examples of coordinated planning and management for these regional-type resources include the following.

Existing park-owned scenic easements will be maintained in perpetuity.

The National Park Service will seek agreements with landowners to provide protection for important scenic resources outside the park boundaries. These particularly include lands in the Guadalupe Pass area, Delaware Mountains, Patterson Hills, Salt Flats, and Guadalupe Escarpment north of the park. Agreements could include development of partnerships and the

acquisition of land rights, such as easements, to protect important viewsheds both within and adjacent to the park.

The development of renewable wind energy in the area could involve individual structures or groups of structures. The National Park Service will work with landowners and energy developers to minimize impacts on scenic views. The National Park Service may also be able to provide information on avoiding or mitigating impacts on other important natural and cultural resources.

The National Park Service will work with area landowners and energy companies to mitigate the impacts of oil and gas development facilities and access roadways.

Particularly in the Greater Otero Mesa area, such development could adversely impact scenic views and air quality within the park.

The National Park Service will continue to work with the Texas Water Development Board, Far West Texas Regional Water Planning Group, groundwater conservation districts, and surrounding landowners to minimize or avoid impacts on park resources. There is concern that activities such as groundwater exports out of the Dell City / Salt Basin area could adversely impact groundwater quality, groundwater quantity, and groundwater-related formations, such as the Salt Flats and the dune formations.

## GENERAL MANAGEMENT PLANNING ISSUES AND CONCERNS

### INTRODUCTION

General management planning involves the development of multiple alternatives that represent different visions for the future management of Guadalupe Mountains National Park. The alternatives are then evaluated for their effects on natural, cultural, and social resources. A record of decision is used to identify the preferred alternative for directing the future management of the park.

The National Park Service views public involvement as a critical component in the success of the alternatives development process and general management planning as a whole. As demonstrated in table 2, the National Park Service provides public involvement opportunities from project initiation through final document publication. The public is defined in Director's Order 75A: Civic Engagement and Public Involvement, as follows:

*The public includes all of the individuals, organizations and other entities who have an interest in or knowledge about, are served by, or serve in, the parks and programs administered by the NPS. They include (but are not limited to) recreational user groups, the tourism industry, Tribes and Alaska Natives, environmental leaders, members of the media, permittees, concessioners, property owners within a park, members of gateway communities, and special interest groups. The public also includes all visitors—domestic and international; those who come in person and those who access our information on the World Wide Web; those who do not actually visit, but value, the national parks; and those who participate and collaborate with the NPS on a longer-term basis.*

An issue is an opportunity, conflict, or problem regarding the use or management of public lands. Issues and concerns relating

to general management planning at Guadalupe Mountains National Park were identified by the public, as defined above, during scoping. As described in "Chapter 5: Consultation and Coordination," comments were solicited using such tools as public meetings, planning newsletters, and the Internet.

Comments received during scoping demonstrated that there is considerable public satisfaction with the current management of Guadalupe Mountains National Park. Specifically, members of the public are generally pleased with the park's facilities and the range and level of public use.

As discussed in Chapter 2 under the heading "Alternatives or Actions Considered but Dismissed from Detailed Evaluation," some public concerns were not incorporated into general management planning. These suggestions either

- were not feasible;
- would conflict with laws, regulations, or NPS policy; or
- are typically addressed in more detailed plans, such as 5-year strategic plans, annual performance plans, and implementation plans.

The issues and concerns that the general management plan can address generally involve determining appropriate visitor uses, types of facilities, and levels of services while remaining compatible with desired resource conditions and existing law, regulations, and policies. Other plans tier from the general management plan and are used to turn the general management plan's vision into reality.

**Table 2: The National Park Service Has Provided Opportunities for Public Involvement throughout the General Management Planning Process for Guadalupe Mountains National Park**

PLANNING ACTIVITY	PUBLIC INVOLVEMENT OPPORTUNITIES
<b>Initiate Project</b> The planning team assembles and begins to identify the project's scope and issues and customize the process to fit Guadalupe Mountains National Park.	Newsletters inform the public about the planning process and solicit feedback. The public can comment on response forms or via the Internet and ask to be included on the park's mailing list.
<b>Initiate Planning Context</b> The team examines WHY Congress established the park and reaffirms the park's mission, purpose, and significance. Team members collect public comments during scoping and analyze relevant technical data.	Public open houses help the public learn about the planning process and add public input.
<b>Develop and Evaluate Alternatives</b> The planning team explores WHAT the park's future could look like, and proposes and assesses a range of reasonable alternatives for the park's future.	Newsletters inform the public about the planning process and solicit feedback. The public can comment on response forms or via the Internet and ask to be included on the park's mailing list.
<b>Prepare a Draft Document</b> The team produces and publishes a <i>Draft General Management Plan / Environmental Impact Statement</i> that discusses HOW each alternative concept would be attained; what the impacts of those actions would be on natural, cultural, and socioeconomic resources; and what costs would be incurred. The draft document describes the planning context, management alternatives, and their impacts. Based on the impacts of implementing the alternatives and public comment, the team defines the NPS' preferred alternative.	The draft plan brings the planning process and alternatives into focus. The public can read the plan and comment by letter or via the Internet on the alternatives and impacts presented. In addition, public meetings are held to inform the public of the plan's contents and the findings of the environmental impact statement, and to obtain public comments.
<b>Prepare and Publish a Final Document</b> Based on public comments on the draft document, the team revises the <i>Draft General Management Plan / Environmental Impact Statement</i> and distributes a final plan to the public.	The final plan is available to the public. It includes the NPS responses to substantive comments, plus all changes made to the plan in response to comments.

## PARKWIDE ISSUES AND CONCERNS

Parkwide issues and concerns are expressed here as questions about the future of the park. They are a compilation of responses received from the public during the initial steps of the general management planning process.

### Resource Management

- What park boundaries would contribute to effective resource preservation?
- What general standards should be established for wildlife and plant community management? Examples include resource protection, resource control, restoration, exotic species control, and possible reintroduction of native species.
- What is the best way to interpret the stratotype sections and provide for research needs while preserving this international benchmark?

- What is the best way to preserve the park's paleontological resources while providing for access trails and other facilities that transverse these resources?
- What management tools could be used to reduce the impacts of visitor use and outside-the-park actions on the park's physical, biotic, and cultural resources?
- How can the National Park Service best meet the desired conditions for wilderness, taking into consideration visitor satisfaction needs, safety, and fundamental resource values?
- How would the museum collections and archives be best managed and preserved?
- What is the best treatment for remnant historic ranching equipment and structures?
- What would be the best use or preservation treatment for historic buildings and landscapes?
- How can the National Park Service gain an understanding of traditional cultural uses of and ethnographic significance to American Indians, and how should these resources best be recognized and managed?
- How do urban growth, changing demographics, and adjacent land uses affect park resources and operations?
- What is the role of wildland fire in maintaining natural ecosystems?

#### **Visitor Use and Understanding**

- Should improvements be made in park orientation and facility support for visitors?
- What are the opportunities to enhance the public's interpretation, experiences, and understanding?
- What is the best use of the space in the visitor center?
- How can the National Park Service provide visitors with consistently available interpretation of wilderness and cultural history?
- What is the appropriate level of outreach to regional communities and schools?

- What part of the park should be managed as backcountry?
- Does public access to the park need to be improved or increased?
- What are appropriate uses of the various landscape units of the park?
- Do visitors with impaired mobility have adequate and appropriate access?
- What are appropriate management and use of sensitive resource areas?
- Are there enough hiking and camping facilities and opportunities?
- Should horseback riding regulations be reevaluated?
- Are there appropriate scenic driving opportunities? What is the proper level of motor vehicle use in the park?
- How are wildlife viewing opportunities best perpetuated? This is an important issue for many visitors because most land in Texas is privately owned and opportunities for viewing wildlife are limited.
- How can the National Park Service best ensure continued access to Guadalupe Canyon and protect the viewshed in the Guadalupe Pass area?

#### **Facilities and Operations**

- What level of park development is appropriate? To what extent should the park provide visitor facilities such as campgrounds, restrooms, water, picnic tables, and shade structures?
- Which locations for the above facilities are appropriate, considering visibility, viewsheds, safety, and resource impacts?
- Is there a need for commercial services?
- What level of minimum improvement is necessary in wilderness to protect character and provide for resource protection and visitor satisfaction?
- What is the appropriate condition of access and level of parking to accommodate current and future use at destination areas and trailheads such as McKittrick Canyon, Frijole Ranch, Williams Ranch, Pine Springs trailhead,



Ship-on-the-Desert, and Salt Basin Dunes?

- What is the appropriate level of trail access to accommodate a wide range of visitor needs?
- What are the best engineering and design measures for park trails to maximize sustainability, reduce maintenance cycles, provide visitor safety, and reduce effects on park resources?
- There is inadequate office space to meet park needs. How can office space requirements be met without impacting visitors and or housing needs?
- What is the appropriate location and size of a park headquarters and office that would improve organizational effectiveness?

## **SITE-SPECIFIC ISSUES**

The Landscape Units map identifies the major landscape components of Guadalupe Mountains National Park. Brief descriptions of the key features within each landscape unit, and the management issues that could be addressed by general management planning alternatives are provided below.

### **Pine Spring Canyon**

Pine Spring Canyon is a deep, rocky, steeply walled canyon containing a deciduous woodland habitat. Erosion has exposed formations containing a wide variety of fossils.

The park's main visitor center at the mouth of Pine Spring Canyon provides information about the park's varied flora and fauna. The short Pinery Nature Trail starts at the visitor center and leads to the ruins of the Pinery, an 1850s stage station. Several longer trails, including the Guadalupe Peak, El Capitan, Devils Hall, Frijole, Salt Basin Overlook, Foothills, and Tejas Trails, begin at the Pine Springs trailhead. Campsites for recreational vehicles and tents are available.

Management issues:

- There are no fuel or food services, or overnight accommodations in or adjacent to the park, except for the Pine Springs recreational vehicle and tent camping sites.
- Hikers experience overcrowding and inadequate parking at the Pine Springs trailhead because recreational vehicle campers share the parking lot.
- Capacity and support facilities for recreational vehicle camping use at the Pine Springs trailhead are inadequate. There is no sanitary dump station for recreational vehicles and potable water facilities are inadequate for filling the water tanks of recreational vehicles.
- Cultural and natural resources in the vicinity of the Pine Springs trailhead and campground are subject to impacts from visitor use.
- The shared visitor center and headquarters building north of the highway has inadequate operational and administrative office space.
- Family and group picnic facilities in Pine Springs vicinity are inadequate.

### **East Alluvial Uplands**

Alluvial uplands are at the foot of the Guadalupe Mountains' eastern escarpment. The many springs that emerge here are critical to the survival of wildlife and supported early human residents. Pinyon-juniper habitat is mixed with semi-desert grasslands.

### **Landscape Units**

Frijole Ranch, just east of Pine Springs, is a historic ranch complex that includes a well-preserved ranch house that was converted by the National Park Service into a museum. The museum depicts the history of diverse human influences on the area. The shaded grounds provide a favorite resting and birding area.

A short walk to the northeast leads to Manzanita Spring. Farther north is Smith Spring at the base of the escarpment. The water at both sites was important to American Indians, who left evidence of their presence in rock ring middens, rock art, and flaking sites. Nearby Nipple Hill is one of the internationally significant geologic stratotypes.

East along the uplands is Ship-on-the-Desert, a house built for the petroleum geologist Wallace Pratt that was designed to resemble an oil tanker. The house is used as a research facility and provides dormitory housing for visiting park researchers, housing for volunteers and, occasionally, space for educational seminars or park-sponsored meetings.

Management issues:

- The Frijole Ranch farmhouse is used as a museum. The historic buildings and landscape, while maintained, are not fully interpreted as a historic ranch.
- Parking near Frijole Ranch also serves Smith Spring Trail and a variety of frontcountry and backcountry trails. Parking capacity is inadequate and support facilities are lacking.
- Picnic activities in the area are not supported by adequate facilities and are incompatible with management of the historic landscape.
- The desired condition for the Ship-on-the-Desert building and landscape need to be determined with regard to preservation and meeting operational needs.

### Eastern Escarpment

The eastern escarpment is a 2,500-foot-high, rocky, mountain face with sparse vegetation. Access to the escarpment is limited by the rugged terrain and few established trails. The steep Bear Canyon Trail affords hikers a sense of the ruggedness and great views south of the park.

The Bear and Smith Canyons serve as seasonal access corridors for elk and provide shelter for exotic aoudad sheep, also referred to as Barbary sheep. Rock outcrops and caves provide geologic and paleontological research opportunities and bat habitat. Rock shelters along the mountainside are important archeological sites, as are the historic water pipelines and tanks.

Management issues:

- Bear Canyon Trail, like most of the park's trail routes to the upland mountain plateau, is extremely steep and exposed and requires frequent maintenance.

### McKittrick Canyon

A visitor contact station is at the mouth of McKittrick Canyon. The center provides access to the short McKittrick Nature Trail, the McKittrick Canyon Trail, and the Permian Reef Geology Trail that goes to the top of Wilderness Ridge and offers a self-guided geology tour and has a designated backcountry campground that is available by permit.

A hike up the canyon is a special experience that features a perennial stream, fragile riparian ecosystems, interesting geologic features and fossils, a rich diversity of wildlife, and vegetation that includes Texas madrones, alligator junipers, ponderosa pines, and the endemic yellow Chapline's columbine and regal red penstemon. Maples, walnuts, ash, chokecherry, and oak brighten the canyon with their fall colors. The relatively gentle trail takes hikers from desert scrub to forest.

A major destination on the trail is the historic Pratt Cabin, 2.5 miles up the canyon. Beyond Pratt Cabin are the Grotto, with limestone formations and stone picnic tables, and the historic Hunter Line Cabin, a relic of the canyon's ranching era.

The water in McKittrick Canyon was important to American Indians, who left

evidence of their presence in rock ring middens, rock art, and flaking sites. The McKittrick Canyon Archeological District, which is listed in the National Register of Historic Places, is located near the confluence of the North and South McKittrick Canyons.

Management issues:

- The McKittrick Canyon Trail is one of the park's most popular trails because of moderate slopes, seasonal color, and proximity to a perennial stream. As a result, this trail is periodically impacted by heavy use.
- Determine the desired condition for Pratt Cabin and its landscape to preserve the resource, meet operational needs, and provide visitor satisfaction.
- Determine if there is a need for sanitary facilities at Pratt Cabin and, if so, what type of facilities would have the least impact.
- The McKittrick Canyon contact station and interpretive displays, including the nature trail, are outdated and limited in their interpretive messages.
- Determine proper maintenance levels and techniques for the Permian Reef Geology Trail to maintain its integrity as a published, interpreted outdoor exhibit.
- The NPS-era 2.5-mile power line to Pratt Cabin detracts from the natural beauty of the canyon and interrupts scenic vistas.

### **Mountain High Country**

The high country, a dissected upland plateau of rock cliffs, rolling hills, and grassy valleys, treats visitors to an exceptional experience after they have conquered the 2,500-foot-high climb from the desert. Most of the area is designated wilderness. Its edges are noted for scenic vistas and the interior is a dense relict forest of ponderosa pine, southwestern white pine, Douglas-fir, and one vestigial stand of quaking aspen.

The forest is especially lush in the "Bowl," a 2-mile-wide depression. In summer, elk and mule deer graze. Black bears and mountain lions are year-round inhabitants. Historic cabins and water pipelines and tanks from the bygone ranching era dot the landscape, along with rock ring middens, hearths, and flaking sites left by American Indians. The wilderness trail system provides access to seven of the park's 10 primitive backcountry campsites, which are available by permit.

Management issues:

- Designated backcountry campsites, particularly those nearest to trailheads, are impacted by visitor overuse.
- Evidence of historic roads and dilapidated water distribution equipment is present throughout the mountain high country wilderness. These features require evaluation and a determination of significance.
- Some backcountry trails, such as the northwest section of Bush Mountain Trail, have become overgrown with brush, resulting in hikers losing their way.

### **Dog Canyon**

Dog Canyon is a small, narrow, secluded area on the northern border of the park. It is accessible from Carlsbad, New Mexico, which is more than 60 miles away, by New Mexico Highway 137. Facilities include a ranger station, campground, picnic area, trailhead, and visitor horse corrals.

Dog Canyon Spring is one of the few dependable water sources in the area. As a result, it attracts wildlife, including deer, mountain lion, and quail. The water was important to American Indians, who left evidence of their presence in rock ring middens, rock art, and flaking sites. Historic copper mines and abandoned homesteads are more recent historic remains.

The 0.6-mile-long Indian Meadow Nature Trail provides an introduction to the flora and fauna of the Dog Canyon area. The

Tejas Trail offers access to the high mountain plateau country. The remote northwest side of the park can be reached using the Bush Mountain Trail.

Management issues:

- Dog Canyon is a rich area of resources that could support a wider range of facilities and visitor experiences than are currently available.
- Part of the Dog Canyon campground is located in a flood hazard zone.

### **Basin and Range**

This area, which includes PX Flat and the Brokeoff Mountains, is some of the most isolated in the park. A Great Basin coniferous woodland covers the more gently rounded hills of the Basin and Range and includes the endemic Guadalupe mountain laurel and isolated stands of one-seed juniper. Coyotes, foxes, and badgers inhabit this area, which has restoration potential for black-tailed prairie dog and pronghorn antelope.

Scattered archeological flaking sites, hearths, and rock ring middens can be found, along with the Cox Cabin and remnants of the Marcus sheep cabin and corral. A small section of the Bush Mountain Trail follows the eastern edge of this area and provides access to the Marcus Campground, which is one of the park's backcountry campgrounds that are available by permit.

Management issues:

- Park resources are isolated and accessible only with substantial effort.

### **Western Escarpment / Guadalupe Peak**

The rugged, remote western escarpment was uplifted 20 and 30 million years ago along a huge fault, and forms a striking scenic backdrop to the wide desert flats. The western aspect is an almost sheer vertical face, and the eastern aspect slopes toward the park's high country. Jagged, 2,000-foot-high cliffs provide protected habitat for

golden eagles, peregrine falcons, and other unique animal and plant species, like the five-flowered rock daisy and the Guadalupe pincushion cactus. Water is extremely scarce.

Guadalupe Peak, which stands a full mile above the floor of the basin to the west, and El Capitan, are major features at the southern end of the escarpment. The rewards of the strenuous hike up Guadalupe Peak include stunning views of more than 80 miles.

Most hikers access the escarpment from Pine Springs via the Guadalupe Peak Trail, which has a primitive campground a mile below the summit. The Bush Mountain Trail extends along the top of the escarpment.

Stratotype Canyon within the escarpment is an internationally known standard for Middle Permian rocks. The escarpment's high caves are known to have significant paleontological resources. In addition, the escarpment forms the mountainous ridge landscape of the White Painted Woman, which is culturally important to the Mescalero Apache people.

Management issues:

- The popular Guadalupe Peak trail is open to horse use and requires high levels of maintenance to keep it safe.
- Western escarpment geological resources are not accessible for many visitors.

### **Salt Basin Dunes**

This dunes landscape is geologically young. It developed over thousands of years as dissolved salts and gypsum from the adjacent lakebed were deposited by the wind into ever-changing sculpted hill, wave, and ripple formations. Both white gypsum and red quartzose dunes dominate the landscape. Mesquite coppices, where the mesquite holds the dunes from blowing away, form stabilized spots where wildlife abounds. The dunes are home to gypsum-loving plant and animal life like gypsum

scalebroom, a white variant of the lesser earless lizard, and five of the park's seven species of scorpions.

With their lower elevation, the dunes are generally warm in winter and dangerously hot in the summer. Numerous hearths, rock ring middens, and flaking sites attest to prehistoric use. This area has been identified by the Tigua Indians of Ysleta del Sur Pueblo as culturally and religiously significant. Water wells and windmills demonstrate more recent historic ranching uses.

This relatively new addition to the park has minimal access and no services. Visitors are allowed to hike over the open dunes, but are encouraged to avoid walking on the fragile black crust of the cryptobiotic and evaporitic soils. Visitors may also hike on abandoned ranch road traces and discover windmills and other historic remnants of the past.

Management issues:

- The dune area lacks nearby road and parking access.
- The area has very harsh conditions, particularly in summer months.
- The lack of services or facilities makes visitor use uninviting and limits visitor satisfaction and understanding.
- The need to protect sensitive natural and cultural resources must be considered in the determination of appropriate visitor access and use capacity.
- The existing access road floods for several months at a time, preventing visitor or staff access to this area of the park.

### **Bajadas / Patterson Hills**

The Bajadas are a broad apron of alluvial deposits laced with deep arroyos. The Patterson Hills, a series of north-south trending low hills adjacent to the Bajadas, are down-faulted remnants of the Permian reef. The area is typical of the arid Chihuahuan Desert, and includes creosote bush, agaves, prickly pear and many other varieties of cacti, chollas, yuccas, and sotol.

Common wildlife includes snakes, kangaroo rats, coyotes, and mule deer.

Historic resources include gas and water well sites and equipment, the Butterfield Stage Route, and the early 1900s Williams Ranch. The latter provides a view of living and working in this rugged, stark, desert environment. The primitive (four-wheel-drive) access road provides a unique opportunity for visitors to experience the remoteness and solitude of the western Bajadas and Williams Ranch. El Capitan Trail and Shumard Campground (a backcountry campground that is available by permit) can be accessed from the ranch. The PX Well and Pure Well areas also have primitive camping by permit.

Management issues:

- There is no all-weather road, and low-clearance vehicles cannot access this area of the park. This substantially limits potential visitor experiences.
- Williams Ranch provides a unique visitor experience but the primitive road condition limits visitor access to this area.

### **Guadalupe Canyon and Pass**

Guadalupe Canyon and Pass represent a "crossroads in time," serving as a transportation route and a landmark for generations of historic and prehistoric peoples. The Guadalupe Pass route snakes between the Guadalupe Mountains and the Delaware Mountain ridge to the south, and then follows Guadalupe Canyon as it drops more than 2,000 feet to the salt flats west of the park.

The current route of U.S. Highway 62/180 over Guadalupe Pass diverges from the historic route, but still passes through some of the park's most spectacular scenery. Road cuts show cross-sections of the area's geologic story, and a rest area along U.S. Highway 62/180 affords spectacular views of El Capitan and Guadalupe Peak. The image of Our Lady of Guadalupe that some can see

on the face of El Capitan is important to contemporary Hispanic groups. A small parking area along the road outside the park on the busy right-of-way provides access to the Salt Basin Overlook Trail, El Capitan Trail, and Guadalupe Canyon across private land.

Reminders of the passing American Indian travelers remain in the form of rock art, rock ring middens, hearths, and flaking sites. More recent historic features include the Butterfield Stage route, the old historic highway, historic dugouts, and the army scout Polancio's grave. An internationally significant geological stratotype section occupies an adjacent hilltop, and many other important paleontological sites are to be found nearby.

Management issues:

- This natural and cultural area is bisected by a state highway and is checkered with private lands, making access discontinuous and difficult.
- Access to this part of the park is across private land by informal agreement.
- Opportunities are limited for safely parking vehicles and accessing park trails and other features.

## CLIMATE CHANGE

Climate change refers to any substantial changes in average climatic conditions (such as average temperature, precipitation, or wind) or climatic variability (such as seasonality or storm frequencies) lasting for an extended period of time (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change (IPCC 2007) provide clear evidence that climate change is occurring and will accelerate in the coming decades. The effects of climate change on national parks is beginning to emerge as both science and impacts become clearer; however, it is difficult to predict the full extent of the

changes that are expected under an altered climate regime.

The National Park Service recognizes that the major drivers of climate change are outside the control of the agency. However, climate change is a phenomenon whose impacts throughout the national park system cannot be discounted. Some of these impacts are already occurring or are expected in to occur at Guadalupe Mountains National Park in the time frame of this general management plan. Therefore, climate change is included in this document to recognize its role in the changing environment of the park and provide an understanding of its impact. Other factors driving environmental change include changes in land use surrounding the park and shifts in visitor use patterns.

Although climate change is a global phenomenon, it manifests differently depending on regional and local factors. In general, "arid ecosystems are particularly sensitive to climate change and climate variability because organisms live near their physiological limits for water and temperature stress. Slight changes in temperature or precipitation regimes, or in magnitude and frequency of extreme climatic events, can significantly alter the composition, abundance, and distribution of species" (Archer and Predick 2008). This dynamic environment is expected to affect the natural resources and visitor use patterns at the park.

Because climate change is a long-term issue that will affect the park during and beyond the scope of this general management plan, this planning effort is intended to lay the groundwork to address climate change issues. In developing this planning document, three key questions were asked:

- What would be the contribution of the alternatives to climate change, as indicated by the amount of greenhouse gases (that is, carbon footprint) that would be emitted under each alternative?

- What are the potential impacts of climate change on the park's resources?
- What management principles could the National Park Service adopt to reduce greenhouse gas emissions and the impacts of climate change on climate-sensitive resources?

Regarding the first question, it has been determined that the management alternatives described in this document would only emit a negligible amount of greenhouse gases that contribute to climate change. Therefore, this impact topic has been dismissed from detailed analysis. See the section titled, "Carbon Footprint" under the "Impact Topics Considered but Eliminated from Detailed Analysis" portion of chapter 1 for more information.

Regarding the second question, climate change could alter resource conditions in many ways at Guadalupe Mountains National Park, but the type and intensity of these changes are uncertain. The potential influences of climate change are described under select resource topics in chapter 3. These include vegetation, wildlife, and visitor experience.

Regarding the last question, this document provides science-based management principles to help guide park managers address future climate change impacts on park resources and reduce greenhouse gas emissions. These principles are described under the preferred alternative in chapter 2.



**The Salt Flats**

## IMPACT TOPICS – RESOURCES AND VALUES AT STAKE IN THE PLANNING PROCESS

Specific resources and values were used to focus the planning process and the assessment of potential consequences of the alternatives. The following four criteria were used to determine the resources and values at stake in the Guadalupe Mountains National Park general management planning process:

- Resources cited in the legislation that authorized Guadalupe Mountains National Park, and other legislation relating to the park, all of which is provided in appendix A. The relevant elements of the legislation are incorporated in the “Park Purpose” and “Park Mission” provided earlier in this chapter.
- Resources critical to maintaining the significance and character of the park. The “Park Significance” statements provided earlier in this chapter describe the defining features of Guadalupe Mountains National Park that were used to establish the resources critical to maintaining the park’s significance and character.
- Resources recognized as important by laws or regulations. A list of many of the important congressional acts and executive orders that guide the management of all NPS facilities, including this park, is provided in appendix B. The relevant elements of these acts and orders as they relate to conditions to be achieved at Guadalupe Mountains National Park are included in appendix C.
- Values of concern to the public during scoping for the general management plan. As described in Chapter 5, the National Park Service conducted a public information and scoping program to acquire input from the public and other agencies. This helped the National Park Service develop alternatives and identify resources and values of high interest in the park.

When resources and values are analyzed by the National Park Service in an environmental impact statement, they are referred to as “impact topics.” A brief rationale for the detailed discussion of each impact topic, or for its dismissal from further consideration, is given below.

### TOPICS TO BE ANALYZED

#### Natural Resources

**Soils, Plant Communities and Vegetation, and Wildlife.** The 1969 National Environmental Policy Act is the national charter for protection of the environment. It requires federal agencies to use all practicable means to restore and enhance the quality of the human environment and to avoid or minimize any possible adverse effects of their actions on the environment. NPS policy is to protect the natural abundance and diversity of all of the park’s naturally occurring communities.

The National Park Service actively seeks to preserve the soil resources of Guadalupe Mountains National Park and to prevent, to the extent possible, the unnatural erosion, physical removal, and contamination of soils. NPS goals for the management of biological resources in Guadalupe Mountains National Park and all other units of the national park system are provided in *Management Policies 2006* (NPS 2006b) and include

- preserving and restoring the natural abundances, diversities, dynamics, distributions, and habitats of native plant and animal populations and the communities and ecosystems in which they occur
- restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions



- minimizing human impacts on native plant and animal populations, communities, and ecosystems, and the processes that sustain them

Because all alternatives for management of the park would involve soils, plant communities and vegetation, and wildlife, impacts on these topics have been evaluated in this document.

**Geologic Resources.** Section 4.8 of *Management Policies 2006* (NPS 2006b) states that “The Park Service will preserve and protect geologic resources as integral components of park natural systems. As used here, the term ‘geologic resources’ includes both geologic features and geologic processes. The Service will (1) assess the impacts of natural processes and human-related events on geologic resources; (2) maintain and restore the integrity of existing geologic resources; (3) integrate geologic resource management into Service operations and planning; and (4) interpret geologic resources for park visitors.”

*Management Policies 2006* (NPS 2006b) require the National Park Service to analyze the impacts of proposed actions on geologic resources. Some of the proposed actions in the alternatives for Guadalupe Mountains National Park could involve modifications to access roads, facilities, and trails. These activities could enlarge the footprint of disturbed areas or create new disturbed areas. Some activities might require minimal blasting or other modification of bedrock geology, and could change the distribution and intensity of geological processes. (Site-specific, future environmental compliance documents would be prepared as needed.) For these reasons, geologic resources were analyzed in this document.

### **Paleontological Resources**

In part, *Management Policies 2006* (Section 4.8.2.1) states

*Paleontological resources, including both organic and mineralized remains in body or trace form, will be protected, preserved, and*

*managed for public education, interpretation, and scientific research. The Service will study and manage paleontological resources in their paleo-ecological context.*

Information on paleontological resources in Guadalupe Mountains National Park was compiled from park records, scientific publications, and consultation with recognized experts. Regardless of which alternative is implemented the National Park Service will:

- Undertake a paleontological inventory and survey, including information on paleontological research that has already been performed in the park, lists of fossil species found in the park, maps of high probability areas expected to produce fossils, recommendations for future research, identification of threats to fossil resources, and strategies for their protection.
- Prepare a paleontology site layer for the park’s geographic information system (that is, a database of fossil localities that have been excavated or are known to contain fossils).

Although extensive precautions would be conducted to protect paleontological resources, the potential exists for the alternatives to impact unknown resources. Additionally, impacts might be unavoidable in some areas. Therefore, impacts to paleontological resources have been analyzed in this document.

### **Cultural Resources**

The National Historic Preservation Act and the National Environmental Policy Act require that the effects of any federal undertaking on cultural resources be examined. Also, *Management Policies 2006* (NPS 2006b) and *Director’s Order 28: Cultural Resource Management* (NPS 1998a) call for the consideration of cultural resources in planning.

Chapter 5 of *Management Policies 2006* (NPS 2006b) addresses cultural resource

management. Consistent with the guidance in this chapter, cultural resource management at Guadalupe Mountains National Park includes

- research to identify, evaluate, document, register, and establish basic information about cultural resources and traditionally associated peoples
- planning to ensure that management processes for making decisions and setting priorities integrate information about cultural resources and provide for consultation and collaboration with outside entities
- stewardship to ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance) to achieve desired conditions, and are made available for public understanding and enjoyment

Actions proposed in this plan could affect archeological resources, historic structures, cultural landscapes, ethnographic resources, and museum collections. Therefore, these topics have been analyzed in this document.

According to Executive Order 13007 on “Indian Sacred Sites” (1996), the National Park Service will accommodate, to the extent practicable, access to and ceremonial use of Indian sacred sites by religious practitioners from recognized American Indian tribes and will avoid adversely affecting the physical integrity of such sacred sites. There are 13 tribes that have identified traditional associations with lands in the Guadalupe Mountains National Park. In particular, the Tigua or Ysleta del Sur Pueblo and the Mescalero Apache tribes have stated that some of these lands continue to be of spiritual and religious significance. Knows sites that may be important to the tribes could be affected by the actions proposed in the alternatives. For this reason, impacts on sacred sites have been analyzed under the topic of ethnographic resources.

### **Visitor Use and Experience**

Providing for visitor enjoyment, understanding and stewardship is one of the

fundamental purposes of the National Park Service. Many actions proposed in this management plan could affect patterns of visitor use and the type and quality of visitor experiences. Specific elements of the visitor experience include visitor access, activities and destinations, orientation and interpretation, recreation, and visitor services, including camping and lodging. However, impacts in other topics, such as wildlife and the availability of wildlife viewing, also could affect visitor experience.

### **Socioeconomic Environment**

The National Environmental Policy Act requires an examination of social and economic impacts caused by federal actions. Businesses in nearby communities and counties could be affected by actions proposed in this management plan. In addition, the alternatives could affect regional economic and demographic conditions, and components such as housing and community infrastructure. For these reasons, the impacts to the socioeconomic environment have been analyzed in this document.

### **National Park Operations and Facilities**

The alternatives proposed in this plan could affect NPS operations and facilities in Guadalupe Mountains National Park, particularly operations, facilities, operational efficiency, and administrative access to the museum collection. For this reason, impacts to NPS operations and facilities have been analyzed in this document.

### **TOPICS DISMISSED FROM FURTHER CONSIDERATION**

Some impact topics that commonly are considered during the planning process were not relevant to this general management plan for Guadalupe Mountains National Park, either because the resource does not occur in the park or because implementing the alternatives would have only a negligible or minor effect on the topic or resource. These

topics are as follows, along with a brief rationale for dismissing them.

### **Air Quality**

The 1963 Clean Air Act, as amended (42 *United States Code* 7401 *et sequens*), requires federal land managers to protect park air quality. *Management Policies 2006* (NPS 2006b) address the need to analyze air quality during park planning.

- The Clean Air Act provides that the federal land manager has an affirmative responsibility to protect the park's air-quality-related values from adverse air pollution impacts. These values include, but may not be limited to, visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and visitor health.
- Section 118 of the Clean Air Act requires the park to meet all federal, state, and local air pollution standards.
- Section 176I of the Clean Air Act requires all federal activities and projects to conform to state air quality implementation plans to attain and maintain national ambient air quality standards.

Guadalupe Mountains National Park was designated a Class I airshed by the 1977 amendments to the Clean Air Act (Public Law 95-217). Class I airshed designation allows for very little deterioration in air quality, and is intended to protect areas of unique scenic value. In addition, under the terms of the Clean Air Act, the wilderness portion of Guadalupe Mountains National Park is designated Class I. The 1977 amendments require state implementation plans to protect visibility in a 100-kilometer (62-mile) region around Class I areas.

Under the Clean Air Act, federal land managers have an affirmative responsibility to protect the air quality related values, including visibility, of lands in Class I areas. Visibility refers to the clarity with which scenic vistas and landscape features are perceived at long

distances. Vistas, including those in national parks, can be obscured by haze, most of which is caused by air pollution particles. When light strikes the particles, some light is absorbed and some is scattered before it reaches an observer. Together, these effects reduce the view's clarity and color.

The Big Bend Regional Aerosol and Visibility Observational (BRAVO) Study (U.S. Environmental Protection Agency *et al.* 2004) quantified the source of haze in west Texas, at Big Bend National Park. It determined that sulfate compounds are the largest contributor, accounting for about half of the particulate haze. Generally, about a third of these sulfate compounds are from Mexico; a third are carried by air masses from the eastern United States; 20 percent are generated in Texas, primarily its eastern part; and 10 percent originate in states to the west. Sources of the sulfate particles included coal-fired power plants, metals smelters, refineries, other industrial processes, and the Popocatepetl volcano in central Mexico near Mexico City. Most of the remaining particulate haze is from dust traveling from as far away as Africa and from carbon compounds, primarily smoke from fires in Mexico and Central America in the spring. Haze sources probably are similar at Guadalupe Mountains National Park, which is about 225 miles north of Big Bend National Park.

Guadalupe Mountains National Park is a very small contributor to haze because of the park's small size; the absence of sulfate particle sources; its largely undisturbed vegetation, which is effective in preventing winds from picking up and transporting large amounts of dust; and the absence of large wildland fires. Because of the park's minimal contribution, the actions associated with implementing any of the general management plan's alternatives would have a negligible effect on the ability of the region to meet the state implementation plan for air quality or U.S. Environmental Protection Agency deadlines. However, regardless of the alternative that is selected, the National Park

Service would continue to work at the local, state, and federal levels to move toward achieving the Class I airshed designation of Guadalupe Mountains National Park.

Should any of the action alternatives be selected, local air quality at project sites would be temporarily affected by dust and vehicle emissions from construction activities. Activities such as hauling materials and operating equipment during the construction period would result in increased vehicle exhaust and emissions.

Fugitive dust from construction equipment would intermittently increase airborne particulates near the project site, but loading rates would not be appreciable. To substantially reduce dust emissions, construction specifications would require the use of water or other dust-reducing agents. Additionally, compliance with all applicable codes and regulations would be mandatory. Other actions that would prevent or control particulate emissions during and after construction are listed in Chapter 2 under “Mitigative Measures.”

Measures used to control construction equipment emissions could include, but not be limited to, using low-emission vehicles and low-pollution fuels, and limiting vehicle idling. Engine emissions of hydrocarbons, nitrogen oxides, and sulfur oxides that did occur would be rapidly dissipated by air currents, since air stagnation is rare within the park.

Because of air pollution control and mitigation measures, there would be a negligible, temporary reduction of local air quality associated with the action alternatives. These effects would last only during construction and until a stable soil cover was reestablished. The park’s air quality would not be expected to experience any long-term, adverse effects. Therefore, air quality was dismissed as an impact topic.

## Carbon Footprint

For this planning effort, “carbon footprint” is defined as the sum of all emissions of carbon dioxide and other greenhouse gases (for example, methane and ozone) that would result from implementing any of the management alternatives. Understanding the carbon footprint of each alternative is important for determining its contribution to climate change.

The management alternatives described in this document would only emit a negligible amount of greenhouse gases that contribute to climate change. Therefore, this impact topic has been dismissed from detailed analysis in this plan. Although limited facility construction is proposed under two of the action alternatives, the impacts of this development on the carbon footprint of the park would be minimal because of mitigation measures employed by the National Park Service.

Development of trailheads would improve visitor experiences by providing better orientation within the park but is not expected to increase vehicle emissions or vehicle miles traveled by visitors to the park. Similarly the development of a group and recreational vehicle campground would improve visitor experience without increasing emissions or vehicle miles traveled in the park. Development of these new visitor facilities would occur on previously disturbed areas to the extent practicable.

Development of the new headquarters building would allow housing units currently used as office space to be returned to their original use. This would allow more of the park staff to live in the park, which would reduce the number of vehicle miles traveled each day by employees to get to work. The new headquarters building would be constructed to Leadership in Energy and Environmental Design (LEED) standards. The National Park Service would continue to operate a van pool for employees who commute to work from Carlsbad, and will purchase hybrid and other high-mileage

vehicles as the vehicle fleet at the park is replaced. To the extent practicable, the park would continue to employ the management measures described in a previous section to minimize greenhouse gas emissions from park operations. Because of the negligible difference in the amount of greenhouse gas emissions that would result from each alternative, a quantitative measurement of their carbon footprint was determined by the planning team not to be practical.

#### **Conflicts with Land Use Plans, Policies, and Controls**

Section 4.5.F.2 of Director’s Order 12 (NPS 2001a) states that an environmental impact statement must consider “possible conflicts between the proposal, and land use plans, policies, or controls for the area concerned (including local, state, or Indian Tribe).” This requirement is based on Sections 1502.16 and 1506.2 (d) of the Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act.

Other jurisdictions that might have land use plans, policies, or controls that could affect, or be affected by, the management of Guadalupe Mountains National Park were identified earlier in this chapter under the heading “Relationship of Other Resource Planning and Management to This General Management Plan.” Specific land use plans, policies, or controls of these jurisdictions that could relate to general management planning at the park are identified in Chapter 4 as part of “Cumulative Impacts and Projects that Make Up the Cumulative Impact Scenario.”

The cumulative impact analysis for each impact topic includes, as appropriate, consideration of possible conflicts between the alternative and the land use plans, policies, or controls of others. Therefore, there was no need to evaluate this as a separate impact topic.

#### **Ecologically Critical Areas, Such as Wild and Scenic Rivers**

In the discussion of how to determine the significance of a proposed action, the Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act recommend evaluating unique characteristics, such as “proximity to . . . wild and scenic rivers, or ecologically critical areas” (Section 1508.27). There are no Congressionally designated wild and scenic rivers within or near Guadalupe Mountains National Park, and no other areas that would be considered ecologically critical. Therefore, this category was dismissed as an impact topic in this document.

#### **Energy Requirements and Conservation Potential**

None of the alternatives proposed in this general management plan would result in a measurable change in energy consumption compared to alternative A, no action / continue current management. None of the alternatives would substantially affect the park’s energy requirements, because any rehabilitated or new facilities would take advantage of energy conservation materials and uses. Any changes in energy consumption resulting from the proposed actions would be negligible compared to the overall energy consumption of the park. Therefore, this topic was dismissed from further consideration.

The National Park Service would pursue sustainable practices whenever possible in all decisions regarding park operations, facilities management, and developments in Guadalupe Mountains National Park. This approach is consistent with the NPS’ *Management Policies 2006* (NPS 2006b).

#### **Environmental Justice**

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by

identifying and addressing disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Guidelines for implementing this executive order under the National Environmental Policy Act are provided by the Council on Environmental Quality (1997). According to the U.S. Environmental Protection Agency (1998), environmental justice is:

*The fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.*

*The goal of this “fair treatment” is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and identify alternatives that may mitigate these impacts.*

There are both minority and low-income populations in the general vicinity of Guadalupe Mountains National Park. However, environmental justice is dismissed as an impact topic because:

- NPS staff actively solicited public participation as part of the planning process and gave equal consideration to input from all persons, regardless of age, race, income status, or other socioeconomic or demographic factors.
- The impacts associated with implementation of the preferred alternative would not disproportionately affect any minority or low-income population or community.
- Implementation of the preferred alternative would not result in any identified effects that would be specific to any minority or low-income community.

- The NPS staff does not anticipate that any adverse impacts on public health and/or the socioeconomic environment would appreciably alter the physical and social structure of the nearby minority or low-income populations or communities.

### Floodplains and Wetlands

Executive Orders 11988 (“Floodplain Management”) and 11990 (“Protection of Wetlands”) require agencies to protect wetlands, examine impacts on floodplains and wetlands, and consider potential risks involved in placing facilities in floodplains. Protection of these resources also is required by the Rivers and Harbors Appropriation Act, Clean Water Act, and National Environmental Policy Act.

Guidelines for NPS managers on developments or other actions proposed in wetlands and floodplains are provided in

- *Management Policies 2006* (NPS 2006b)
- *Director’s Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a)
- *Director’s Order 77-1: Wetland Protection* (NPS 2002) and its associated *Procedural Manual 77-1: Wetland Protection* (NPS 1998b)
- *Director’s Order 77-2: Floodplain Management* (NPS 2003) and its associated *Procedural Manual 77-2: Floodplain Management* (NPS no date)
- Executive Order 11988, Floodplain Management
- Executive Order 11990, Protection of Wetlands

**Floodplains.** Guidance requires the National Park Service to preserve floodplain values and to minimize potentially hazardous conditions associated with flooding. Floodplains in Guadalupe Mountains National Park are limited to perennial and intermittent streams. The park occupies an area surrounding the highest point in Texas in a mountain range

surrounded by the Chihuahuan Desert. Drainage is generally dispersed, rapid, and ephemeral; therefore, there are no 100-year or 500-year delineated floodplains in the park. Instead, low areas adjacent to ephemeral drainages are considered flash-flood zones. They present flooding hazards only when there are infrequent, high-volume storms.

The Pine Springs visitor center and campground and the Dog Canyon campground are within flash-flood zones. The National Park Service has an emergency management plan that specifies under what conditions the visitor center and campgrounds should be evacuated. The plan also specifies when park staff should implement various control techniques, such as placing sandbags to direct water away from the visitor center.

The preferred alternative and alternative C propose moving the recreational vehicle and group camping facilities at Pine Springs to another location in the park to minimize the impacts of the campground on park resources, including the viewshed. Avoidance of the flash-flood zone would be a key criterion in siting the new campground. Because a site for the new campground has not been identified, impacts on floodplains that would result from new campground are undetermined.

The action alternatives also propose actions in Dog Canyon. Under the preferred alternative, the group campsites would be improved. Under alternative C, the recreational vehicle and group campsites would be improved and the corral would be expanded. The proposed improvements would be in areas above historic flood levels.

Before these actions were implemented, site-specific planning, including design and compliance with the National Environmental Policy Act, would occur. Site-specific planning would include developing mitigation measures to minimize risk to visitors, park resources, and property from flash floods. In Dog Canyon, mitigation measures could include maintaining only those campsites

located above historic flood levels. Mitigation measures that could be employed at both sites might include the following:

- Increase visitor education and outreach regarding risks and appropriate responses to flash floods in the park.
- Use nonstructural measures, such as sandbags and emergency notification, to reduce hazards to human life and property while minimizing impacts on the natural resources of flood zones.
- Ensure that structures and facilities are designed to be consistent with the intent and the standards and criteria of the National Flood Insurance Program (44 *Code of Federal Regulations* 60).

With the implementation of these mitigation measures, the long-term impacts on floodplain processes would be negligible or minor. For this reason, the impacts on floodplains related to the implementation of this general management plan are not analyzed further.

**Wetlands.** Guidance requires the National Park Service to protect and enhance natural wetland values and examine the impacts of actions on wetlands. Policy includes avoiding wetland effects and minimizing impacts when they are unavoidable. To facilitate this policy:

- All facilities would be located to avoid wetlands, if feasible.
- If avoiding wetlands was not feasible, other actions would be taken to comply with the guidelines cited previously, and with Section 404 of the Clean Water Act, which regulates the discharge of dredged or fill material into wetlands. These actions would include preparation of National Environmental Policy Act documentation and permitting under Section 404 of the Clean Water Act. It also could include design specifications to mitigate adverse impacts to the extent practicable.
- If the selected alternative would result in adverse impacts on wetlands, the National

Park Service would prepare a statement of findings for wetlands. The statement of findings would include an analysis of the alternatives, a delineation of the wetlands, a wetland restoration plan to identify mitigation, and a wetland functional analysis of the impact site and restoration site.

- Compensation for remaining unavoidable adverse impacts on wetlands would be made by restoring wetlands that previously were destroyed or degraded.

The small areas of wetlands within Guadalupe Mountains National Park are a vital part of the surrounding landscape. Wetlands include seeps and springs, permanent and intermittent streams, vernal pools, and small marshes at the mouths of canyons.

The action alternatives would include measures that would impact two wetland areas in the park: Manzanita Spring and Smith Spring.

*Manzanita Spring.* Manzanita Spring, near Frijole Ranch, has been actively manipulated, primarily by dredging, to maintain a large pond for at least 100 years.

The continuation of periodic dredging under all alternatives would produce long-term conditions that were similar to current conditions. Therefore, the *change* associated with continued dredging would be negligible. Dredging would have short-term adverse effects but, as they have in the past, the flora and fauna associated with the site would quickly recover. This dredging would maintain the character of the cultural landscape, which is listed in the National Register of Historic Places and which includes the spring as a component.



Manzanita Spring

*Smith Spring.* Smith Spring is upstream from Manzanita Spring and is part of a popular loop trail. The current trail alignment directs visitors to an area adjacent to the spring but minimizes impacts on the spring with handrails.

The current stepping stones on the trail that crosses the Smith Spring runoff have a negligible effect on the spring and its runoff. The well-placed and -maintained stepping stones have physical impacts that are similar to natural rocks in a stream and have low visual intrusion on the natural setting. Because foot traffic is channeled onto their surfaces rather than the stream bed, they are effective in protecting the water resource and related geological resources, such as travertine that might form.

The National Park Service would perform site-specific planning prior to implementing any construction at Manzanita Spring or Smith Spring. This would include appropriate Clean Water Act, National Environmental Policy Act and National Historic Preservation Act, Section 106 compliance, including analysis of site-specific impacts. Because the effects of actions at these sites would have no greater than minor intensities, and because impacts would be investigated in depth during site-specific planning, wetlands were dismissed from further analysis at the general management planning level.



### **Indian Trust Resources**

Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by agencies of the Department of the Interior be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources in Guadalupe Mountains National Park. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources were dismissed as an impact topic.

### **Lightscape Management**

In accordance with Section 4.10 of *Management Policies 2006* (NPS 2006b), the National Park Service strives to preserve natural lightscapes, which are natural resources and values that exist in the absence of human-caused light. At Guadalupe Mountains National Park, the National Park Service strives to

- limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements
- ensure that all outdoor lighting is shielded to the maximum extent possible
- keep light on the intended subject and out of the night sky

The actions proposed in the alternatives would not affect the existing exterior lighting of the visitor center or parking area.

More lighting would be used for the new recreational vehicle and group campground, with hook-ups and more restrooms. Impacts would be negligible to minor because the lights would be shielded, directed to keep light on the intended subject, and localized in the

area of the campground. As a result, light from the campground would not adversely affect the night sky elsewhere in the park.

There could be an indirect impact on the night sky from automobiles on the road from Williams Ranch to Dell City (proposed in alternative C). These impacts would be negligible to minor because use of the road at night would be infrequent. Therefore, lightscape management was dismissed as an impact topic.

### **Prime and Unique Farmland**

The Council on Environmental Quality (1980) directed that federal agencies must assess the effects of their actions on farmland soils classified by the United States Department of Agriculture's Natural Resources Conservation Service as prime or unique.

- Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops.
- Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops.

According to the Natural Resources Conservation Service, there are no prime farmlands associated with Guadalupe Mountains National Park. Therefore, prime and unique farmland was dismissed as an impact topic.

### **Public Health and Safety**

In the discussion of how to determine the significance of a proposed action, the Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act require consideration of "The degree to which the proposed action affects public health or safety."

At Guadalupe Mountains National Park, public health and safety already are addressed in a variety of plans and regulations. Examples include the park's fire management plan (NPS 2005) and the superintendent's compendium,

prepared to comply with Title 36, *Code of Federal Regulations*, Chapter 1, Parts 1 through 7.

Under any of the alternatives, including the alternative of no action, the plans and regulations that affect health and safety would remain in effect, and their character and scope would not change. Therefore, the proposed alternatives would have a negligible impact on public health and safety. For this reason, public health and safety has not been further analyzed in this document.

### Soundscape Management

In accordance with Section 4.9 of *Management Policies 2006* (NPS 2006b), preservation of natural soundscapes associated with national park system units is an important part of the NPS mission.

Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among national park system units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

Hauling material, operating equipment, and conducting other construction activities in association with implementing the action alternatives would increase human-caused sounds. Construction sounds would be temporary, lasting only as long as the construction activity.

To minimize noise impacts, the National Park Service would require each contractor to develop and implement a construction noise and vibration control plan. Typical measures that could be implemented to minimize construction noise would include

- requiring equipment to be in good working order with properly functioning mufflers
- employing acoustical shrouds, such as noise-reducing blankets or hay-bale shields, around noisy equipment such as air compressors
- installing noise baffling devices on heavy construction during activities such as excavation and grading

With mitigation in effect, construction sounds would have a short-term, adverse, negligible to minor impact on visitor enjoyment in developed areas in and near construction sites.

Sounds from wilderness and backcountry trail construction would be minimized by rigorously applying minimum tool standards. As a result, the short-term, adverse effects from construction would have negligible to minor intensity.

Changes to the soundscape can cause changes in wildlife behavior. The preferred alternative and alternative C include development actions that could alter the existing soundscape and these changes could impact wildlife. Under these alternatives the proposed actions include development of a consolidated headquarters and administration building and a campground for recreational vehicles. However, both of these proposals would occur within the footprint of the existing front country area of the park near Pine Springs. Neither development is expected to increase the level of background noise within the front country area because while the configuration of the existing uses would change, no new uses are proposed. For this reason, the proportion of human-caused sound in the soundscape is not expected to appreciably increase; therefore, the long-term adverse impacts of changes in the soundscape on wildlife would be negligible to minor.

Because of the minimal effects that the alternatives would have on the park's natural quiet, soundscape management was dismissed as an impact topic.

### **Special Status Species (Threatened and Endangered Species, Species of Concern, and Designated Critical Habitats)**

The Endangered Species Act (1973), as amended, requires an examination of impacts on all federally listed threatened or endangered species. Section 4.4.2.3 of *Management Policies 2006* (NPS 2006b) also requires the inventory, monitoring, and management of other categories of special status species, including federal candidate species, state- and locally listed species, and species of special concern to parks, such as rare, declining, sensitive, or unique species, and their habitats.

The most recent information available from the U.S. Fish and Wildlife Service (2007) was obtained to identify species that are federally listed as threatened or endangered. Four such species were identified in Culberson and Hudspeth Counties. However, only one, the threatened Mexican spotted owl (*Strix occidentalis lucida*) is of concern within Guadalupe Mountains National Park. Critical habitats have been designated for this species, but all critical habitats are located outside Texas (U.S. Fish and Wildlife Service 2007).

Most of the special status plants and animals in Guadalupe Mountains National Park inhabit areas largely away from existing park development, backcountry trails, and campsites. These areas would not be altered or developed under any of the alternatives. Therefore, proposed actions such as new or upgraded picnic areas, campgrounds, roads, trailheads, and restrooms could be implemented without affecting these species of concern.

A few state-listed special status plant species, including the gypsum scalebroom and McKittrick pennyroyal, grow close to existing roads or trails. Before the National Park Service implemented any disturbance under any of the alternatives, it would prepare a detailed development plan and would perform biological surveys. If individuals of these species were detected, the plan would be

revised to protect them through avoidance. Therefore, special status species were dismissed as an impact topic in this document.



**Salt Basin Dunes**

### **Species Restoration, Exotic Species Control, and Extirpated Species Reintroduction**

Section 4.4.1.3 of *Management Policies 2006* (NPS 2006b) states:

*Native species are defined as all species that have occurred, now occur, or may occur as a result of natural processes on lands designated as units of the national park system. Exotic species are those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities. Exotic species are also commonly referred to as nonnative, alien, or invasive species. Because an exotic species did not evolve in concert with the species native to the place, the exotic species is not a natural component of the natural ecosystem at that place.*

Exotic species are of concern because they can displace native species and disturb the natural ecosystem. Management and control of plant and animal exotic species, up to and including eradication, are undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.

Guadalupe Mountains National Park has approved plans and programs to manage the restoration of certain species; control the introduction, manage, and effect removal of exotic species; and reintroduce extirpated species where possible. These plans and

programs would continue to be implemented regardless of which alternative was selected.

The management of species reintroduction, exotic species control, and reintroduction of extirpated species is governed by laws, policies, and mandates. None of the proposals associated with general management planning would result in change or further management action. Implementation of the action alternatives may produce beneficial, long-term effects on native species. Therefore, this impact was dismissed from further consideration.

### **Water Quality and Quantity (Surface and Groundwater)**

Surface water is scarce in Guadalupe Mountains National Park. Most streams in the park flow intermittently. Water used in park facilities is obtained from groundwater.

While some construction associated with the action alternatives could change water quality, the impacts would be short-term and would be minimized through mitigation. For example, sedimentation basins and silt fences would be used to prevent sediment in runoff from reaching waterways, and temporary ground covers, such as erosion matting or weed-free straw, would be installed to protect soil until a natural vegetative cover was reestablished.

In the long-term, the new or upgraded facilities associated with the action alternatives would increase the volume of water used by visitors. However, because this adverse effect would involve only a few gallons per person per day, it would not cause detectable hydrogeological changes, even locally, and would be of negligible intensity. Trail maintenance would be beneficial to water quality, but the intensity would be negligible or minor because the improvements would occur only during the relatively infrequent wet periods and only for a short distance downstream from the action.

In addition, the park staff has initiated actions to protect water quality in the park from

management and visitor-related activities. For example, a potential source of nonpoint source pollution in the park is horse manure from both park and visitor animals. To reduce the potential impacts of nonpoint source pollution from horse manure in the park, park staff removes all manure from the park corrals daily. Park staff will also remove horse manure from public corrals if the visitors fail to do so. Similarly, horses are not allowed in McKittrick Canyon, the area with a trail and a primary perennial source of water.

None of the alternatives would substantially change the quantity or quality of the park's surface or groundwater sources in either the short or long term. For this reason, impacts on water quality and quantity were eliminated from further consideration.

### **Wilderness Resources and Values**

The NPS' wilderness management policies are based on statutory provisions of the 1916 Organic Act, the 1964 Wilderness Act, and legislation establishing individual units of the national park system. Section 6 of *Management Policies 2006* (NPS 2006b) requires that "Wilderness considerations will be integrated into all planning documents to guide the preservation, management, and use of the park's wilderness area and ensure that wilderness is unimpaired for future use and enjoyment as wilderness." Among the attributes of wilderness is protection of wilderness character, including opportunities for solitude and a primitive, unconfined type of recreational experience.

The action alternatives call for providing additional trail access in designated wilderness and backcountry areas within the Guadalupe Mountains National Park. Short-term, adverse effects on wilderness resources and values would result from construction activities, including limited use of dynamite and rock drills. However, because these highly transitory activities would be timed to minimize disturbances to other resources and the wilderness experience, the intensity of the impact would be negligible.

In the long term, the proposed improvements in the trails would improve safe access to wilderness areas. Past projects have reduced the number of people who must be rescued from the backcountry, and similar results would be expected from future improvements.

Upgrades of the formal trail system also would reduce the likelihood of visitors creating their own trails, commonly called “social trails.” Because social trails do not include any provisions for stability or erosion control, they typically produce soil losses and vegetation trampling, and can damage cultural and paleontological resources. Environmental planning and compliance would be completed as appropriate prior to any of the proposed trail upgrades.

All of the alternatives include proposed improvements to the Williams Ranch Road. Under the preferred alternative and alternative B, some improvements would be made to the Williams Ranch Road to reduce long-term maintenance requirements. The level of use on the road is not expected to change because access would continue to be limited to high clearance vehicles. In addition, the number of vehicles allowed on the road per day is limited by the size of the parking lot at Williams Ranch. For this reason, the actions

proposed under these alternatives would pose negligible long-term adverse impacts for solitude opportunities along the Williams Ranch Road. Under these alternatives, visitors could experience a small increase in opportunities for solitude along the road because the road will require less maintenance in the long term. Under alternative C, additional improvements would be made to the road to accommodate low clearance vehicles. However, the number of vehicles allowed on the road per day would continue to be limited by the size of the parking lot at Williams Ranch. For this reason the actions proposed under this alternative would have a negligible long-term adverse impact on opportunities for solitude along the Williams Ranch Road. Under this alternative, visitors could experience a small increase in opportunities for solitude along the road because the road will require less maintenance in the long term.

These actions would result in long-term, beneficial impacts because visitors could continue to access wilderness areas while wilderness values and character would continue to be preserved for future generations. Consequently, the topic of wilderness values was dismissed in this document.





**CHAPTER 2:**  
**ALTERNATIVES,**  
**INCLUDING THE PREFERRED ALTERNATIVE**







## INTRODUCTION

As noted in Chapter 1, many aspects of the desired conditions of Guadalupe Mountains National Park are defined in the establishing legislation, the park's purpose and significance statements, and the servicewide mandates and policies that apply to all units of the national park system. Within these parameters, the NPS planning team solicited input regarding the park's desired condition from the public, NPS staff, government agencies, tribal officials, and other organizations. The National Park Service then used this information to develop four planning alternatives that reflect the range of ideas proposed by the National Park Service and the public.

This chapter describes the management zones that define desired conditions for park resources and visitor experiences within the park. It then presents four alternative

approaches for managing the park for the next 15 to 20 years. Each alternative includes the concept, management zones, and costs. The NPS planning process requires development of action alternatives (which for this plan include the preferred alternative, alternative B, and alternative C) which are compared with current park management and trends (alternative A, the no action alternative).

Supporting information includes identification of mitigation measures that would be applied regardless of the alternative that was selected, future plans that would be needed, and alternatives or actions that were not included in any of the alternatives, with explanations of why they were dismissed. The environmentally preferred alternative is identified, and tables are presented that highlight the differences among the alternatives and summarize their impacts.



El Capitan from Williams Ranch Road

## FORMULATION OF MANAGEMENT ZONES

### PURPOSE OF MANAGEMENT ZONES

Management zones are descriptions of desired conditions for park resources and visitor experiences in different areas of the park. The management zones identify the widest range of potential, appropriate resource conditions, visitor experiences, and facilities for the park that fall within the scope of the park's purpose, significance, and special mandates.

Each management zone describes a different approach to administering or treating the resources or uses within a specified area. Management zones are based on the desired outcomes for natural and cultural resource conditions and visitor opportunities. To achieve these outcomes, management approaches include target goals or objectives for the resources and visitor experiences within the zone. Two of the factors considered during the development of the management zones were visitor use capacity and management of wilderness.

### Visitor Use Capacity

A consideration when developing management zones is the intensity of visitor use that can be sustained within various part of the park.

The National Park Service defines visitor use capacity as the type and level of visitor use that can be accommodated while sustaining desired resource conditions and visitor experiences in the park so they are left unimpaired for future generations. General management plans are required to include identification and implementation commitments for use capacities for all areas of a park. User capacity does not necessarily involve identifying a maximum number of visitors. It also may not require closing or limiting visitor access to particular areas. Rather, user capacity is measured by comparing desired resource and visitor

experience conditions to actual conditions and, when an imbalance is noted, employing management practices to return to the desired conditions. Factors considered may include visitor density, types of activities, types of resources, and measurable impacts on those resources.

Managing user capacity involves the following steps:

- Identify desired conditions for resources and visitors.
- Identify indicators, which are the attributes to monitor for desired conditions.
- Identify standards, which are the limits of acceptable change for the indicators.
- Monitor the indicators against the standards.
- Take management actions as needed to ensure that standards continue to be met.
- Evaluate and make adjustments to the capacity management process based on ongoing resource or visitor information.

The management zones defined in the following pages establish the desired conditions within each area of the park to which that zone is applied. In subsequent planning that tiers from this *General Management Plan*, these desired conditions will serve as the basis for developing mechanisms, including the indicators and standards that denote when visitor capacity is being approached or exceeded, and the management actions that would be implemented when concern was indicated.

Within Guadalupe Mountains National Park, visitor use capacity planning currently is needed at McKittrick Canyon; the Pine Springs visitor center, campground, and trailhead; and Frijole Ranch. The use of this technique may also be appropriate at the Salt Basin Dunes within the 15- or 20-year timeframe of this document.

Because this *General Management Plan* addresses the future of Guadalupe Mountains National Park at a broad, overview level, it does not include details for addressing visitor use capacity at specific park locations or facilities. However, the National Park Service commits to developing and implementing a visitor use capacity program as part of implementing this *General Management Plan*.

### Management of Wilderness

The Wilderness Act mandates the types of visitor and administrative activities, as well as the level and types of facilities development, allowed in designated wilderness areas. Procedures for managing lands that possess wilderness qualities have been developed by Congress and the National Park Service. Consistent with these procedures

- The park staff performed a wilderness eligibility assessment to identify lands within Guadalupe Mountains National Park that possess wilderness qualities and should be studied for future wilderness designation. The results are presented in appendix D of this *General Management Plan*.
- A future wilderness study will evaluate the lands that were identified as possessing wilderness qualities to determine if they should be recommended to Congress for wilderness designation.

Until this process is completed, the National Park Service will manage these lands to preserve their wilderness qualities. Consistent with this approach, all lands found eligible for future consideration for wilderness were assigned to the backcountry zone in all of the action alternatives. This zone would protect these lands from incompatible development and inappropriate use.

### MANAGEMENT ZONES FOR THE GENERAL MANAGEMENT PLAN

Each of the action alternatives for Guadalupe Mountains National Park has six management

zones. Alternative A, the no action / continue current management alternative, does not include the use of management zones, and also may not meet all park management goals.

Different physical, biological, and visitor opportunities and experiences are emphasized in each management zone. These factors then define the types of activities or facilities that are appropriate within the area to which the zone is applied.

Although the configuration of the management zones is different in each of the action alternatives, all of these alternatives are designed to meet all of the park-specific purposes, significance statements, and mission goals, and to conform to the servicewide mandates and policies that were described earlier in this general management plan. For example, an archeological site will be protected, regardless of the zone in which it occurs. However, the *use* of that site for interpretive or educational purposes could vary, depending on the management zone applied to the site.

The six management zones used in the action alternatives include

- designated wilderness
- backcountry (assessed as eligible for wilderness)
- wilderness threshold
- frontcountry
- developed
- motorized scenic corridor.

Table 3 presents the characteristics of each management zone. These include

- the desired resource condition or character
- the desired visitor experience, or what the visitor sees, feels, and/or encounters
- appropriate activities or facilities, which describe what the visitor would be doing and the facilities that might be suitable.

**Table 3: Guadalupe Mountains National Park Management Zones for the Action Alternatives**

MANAGEMENT ZONE	DESIGNATED WILDERNESS	BACKCOUNTRY	WILDERNESS THRESHOLD	FRONTCOUNTRY	DEVELOPED	MOTORIZED SCENIC CORRIDOR
Resource condition or character	In these undisturbed natural settings, natural processes predominate. Visitor access and use improvements are primitive or absent. Significant cultural resources could be present and, as appropriate, are stabilized and preserved.	These lands are eligible for future consideration as wilderness, but have not been so designated by Congress. Resource character and condition are the same as designated wilderness.	Minimally disturbed natural settings are managed for a low level of human intervention and development. Significant cultural resources are stabilized and preserved as necessary.	Lands are natural in appearance with a moderate level of human intervention and development. Natural systems could be modified. Significant cultural resources are preserved or potentially rehabilitated for operational or visitor use.	The landscape includes natural features, but is highly modified and managed for visitor use. Significant cultural resources are preserved or rehabilitated for operational or visitor use.	This zone applies to vehicular corridors which pass through natural settings. Land within this zone has been moderately to highly modified.
Visitor experience	Access could be challenging. Visits are self-directed. Visitors experience a sense of high adventure and risk, solitude, and wildness. Chances for encounters with other people are extremely low.	Desired visitor experiences are the same as designated wilderness.	Access to and throughout these areas could be moderately challenging. Visitors experience a moderate sense of risk, adventure, and remoteness. Chances for encounters with other people are low.	Access presents a low to moderate challenge and a low level of adventure and risk. Encounters with other visitors are common.	Areas are easily and conveniently accessed by foot, bicycle, or motor vehicle from improved roads or trails. Frequent encounters with large numbers of visitors and staff are expected.	The corridors are accessible for automobiles (some are limited to four-wheel drive), bicycles, or hikers. Visitors experience landscapes with diverse, scenic features and frequent encounters with other people and vehicles.
Appropriate activities or facilities	Dispersed visitor activities predominate, including hiking, horseback riding, primitive camping, exploring, and wildlife viewing. Development could include narrow, unsurfaced trails; primitive trail markers; minimal trail drainage and erosion control measures; designated tent pads; and primitive sanitary facilities.	Appropriate activities are the same as designated wilderness.	Moderately dispersed visitor activities include hiking, horseback riding, resource education and discovery, and primitive picnicking and camping. Developments could include wider, more accessible trails; directional and interpretive signs; rustic benches and shade improvements; and rustic restrooms.	Visitor activities include hiking, horseback riding, picnicking, hike-in camping, nature study, and wildlife and scenic viewing. Developments could include improved and surfaced trails, gravel parking lots, picnic and staging areas, walk-in campground sites, and modern restrooms.	Activities include nature study, developed picnicking and camping, and scenic viewing. Visitor developments could include visitor centers, paved trails and parking lots, picnic area clusters, developed campgrounds accessible by automobile or recreational vehicle, and modern restrooms. Park administration and operations developments include maintenance and administrative facilities and staff housing. Screening separates these facilities from visitor use areas.	Visitor activities include scenic driving, wildlife viewing, hiking, and nature study. Development includes graded and surfaced (gravel or paved) roads and pullouts, parking lots, interpretive displays, and modern restrooms.

A description of each zone is provided below. The description includes the types of indicators that could be monitored to ensure that the desired conditions are being maintained, and examples of actions that could be taken when the potential for nonconformance with desired resource conditions or visitor experiences is indicated.

### **Designated Wilderness**

Only the lands that have been designated as wilderness by Congress in accordance with the Wilderness Act are assigned to the designated wilderness zone. These lands are managed to preserve wilderness resources and values, as prescribed by law. They present outstanding opportunities for solitude or primitive and unconfined recreation. Visitor facilities within areas assigned to the designated wilderness zone are primitive or absent. The desired resource condition or character, desired visitor experience, and appropriate activities or facilities in designated wilderness are presented in table 3.

Park staff would monitor resource conditions and visitor use patterns in the designated wilderness. General information, such as permit information and follow-up use data, would continue to be collected. Specific resource and visitor experiences would continue to be monitored. The number of permits issued could be adjusted to protect wilderness resources and the visitor experience.

Indicators in this zone could include, but may not be limited to

- the condition of important resources, such as riparian communities, indicator species, soil erosion, vegetation cover, and historic structures
- visible impacts, such as the presence of visitor-created trails, denuded or compacted campsites, trash, wood cutting, or invasive plants
- visitor experience values, such as encounter rates, camp area capacity, human or livestock excrement, and aesthetics

A combination of indicators would be monitored in specific popular or resource-sensitive areas to ensure that desired resource conditions were maintained and that desired visitor experiences were achieved. The park's wilderness management plan (NPS 1995d) would be updated to include specific indicators and standards to achieve wilderness management objectives.

Actions that could be undertaken to address adverse changes in resource conditions or visitor experiences could include, but may not be limited to managing

- the resource, such as removing invasive plants or rehabilitating damaged areas
- user activities, such as modifying permit numbers to reduce or shift use
- information, which would involve educating and informing wilderness users
- facilities, such as modifying trails, campsites, and trailheads
- administrative practices, which could involve changing wilderness staff levels or altering permit requirements for special uses

Details regarding indicators, standards, monitoring, and management actions to protect wilderness resources and visitor experiences within this zone will be included in the next update of park's wilderness management plan (NPS 1995).

### **Backcountry**

The backcountry zone provides the same wilderness resource protection and visitor experience as the designated wilderness zone. However, the land in this zone has not been designated as wilderness in accordance with the Wilderness Act.

All lands found eligible for future consideration as wilderness were assigned to the backcountry zone in all of the action alternatives. This zone would protect them from incompatible development. The indicators and actions that would be used to maintain the desired resource conditions and visitor experiences in backcountry zones

would be the same as those described for the designated wilderness zone in table 3.

### **Wilderness Threshold**

Areas within the wilderness threshold zone have few facilities and services, and provide a relatively remote or isolated visitor experience. As shown in table 3, improved trails, signs providing direction or interpretation, and rustic visitor facilities could be present in this zone. Levels of use primarily are controlled by proximity to trailheads and capacity of trail facilities.

Indicators would be monitored to ensure that desired resource conditions and visitor experiences are met. Indicators in this zone could include

- the condition of important resources, such as riparian communities, vegetation cover, and archeological or paleontological sites
- visible impacts, including the presence of visitor-created trails, soil erosion, trash, or invasive plants

Types of management actions to address changes in resource conditions could include defining trailheads, trail edges, and visitor use area; restoring disturbed sites; removing invasive plants and revegetating using native plants; and expanding educational programs.

### **Frontcountry**

The frontcountry zone is generally applied to areas of moderate use in the more accessible, low-country parts of the park. Levels of use in this zone are primarily controlled by the presence and capacity of existing facilities such as roads, trails, parking areas, and trailheads. The desired resource condition or character, desired visitor experience, and appropriate activities or facilities in frontcountry areas are presented in table 3.

Indicators would be monitored to ensure that the desired conditions are met. These indicators could include

- the frequency with which use approaches or exceeds the design capacity of facilities such as roads, parking lots, and buildings
- the number of visitors at one time and sense of crowding at popular destinations
- the condition of natural and cultural resources
- visible impacts, such as the presence of visitor-created trails and unplanned widening of trails, soil erosion, and the presence of invasive plants
- visitor satisfaction, based on anything from formal surveys to oral comments or complaints

The National Park Service would continue to collect general information, such as visitor use patterns, parking problems, crowding in facilities and trailheads, vandalism, numbers of law enforcement incidents, accidents, waste quantity, and requests for special uses. This information would be analyzed to identify changes over time.

Management actions that could be taken to address unacceptable impacts in the frontcountry zone include

- improving trail delineation or hardening trails
- increasing education about resource protection
- implementing a permitting system for hike-in camping
- modifying facilities
- encouraging visitors to come during less crowded times or to visit less popular park areas

### **Developed**

The developed zone includes the high-use areas of the park. The desired resource condition or character, desired visitor experience, and appropriate activities or facilities in developed areas are presented in table 3. Levels of use are primarily controlled by the physical capacity of facilities such as parking areas, campground sites, and picnic tables.

Park staff would collect the same information described in the frontcountry zone. This information would be analyzed for changes over time. Management actions that could be undertaken if unacceptable impacts occur would include those identified in the frontcountry zone. Additional, more intensive management could include

- developing parking management strategies
- designing facilities to confine or reduce impacts
- removing exotic plants
- restoring damaged areas

### **Motorized Scenic Corridor**

Areas within the motorized scenic corridor zone provide access to improved visitor facilities, trailheads, historic and natural resource areas, and scenic resources in the low-country areas of the park. Levels of use within the motorized scenic corridor zone primarily are controlled by the improvement level and capacity of the roadways and the facilities they serve. The desired resource condition or character, desired visitor experience, and appropriate activities or facilities in motorized scenic corridors are presented in table 3.

Park staff would continue to collect general information, such as traffic levels, accident rates, road surface and shoulder condition, law enforcement incidents, and exceedences of parking capacity. This information would be analyzed to determine use characteristics and maintenance needs. More specific indicators and standards would be established to monitor for problems that typically develop along road corridors, such as the presence and expansion of invasive plants and the development of social trails.

The range of management actions that might be undertaken if unacceptable impacts occur along motorized scenic corridors could include, but would not be limited to,

- increasing education about resource protection
- defining road and parking facility edges, using signage so that parking is limited to desired locations, and providing pullouts
- defining trailheads
- improving surrounding facilities, such as by hardening walkways, trails, and access points leading from roads to reduce or confine impacts
- removing exotic plants
- restoring damaged areas

## FORMULATION OF ALTERNATIVES

The alternatives focus on what resource conditions and visitor uses, experiences, and opportunities should be available at Guadalupe Mountains National Park rather than on the details of how these conditions, uses, and experiences should be achieved.

### DEVELOPING MANAGEMENT CONCEPTS

This *General Management Plan* presents four alternatives for future management of Guadalupe Mountains National Park.

Alternative A, the no action alternative, represents a continuation of existing management. It is included as a baseline for comparing the consequences of implementing each action alternative. Alternative A does not necessarily meet all of the goals and objectives that are critical if the National Park Service is to consider the general management plan successful. The National Park Service may also have difficulty satisfying some of the park-specific purposes, significance statements, or mission goals, and/or some of the servicewide mandates and policies that were presented in Chapter 1 and appendix C.

The three action alternatives present different ways to manage resources and visitor use, and to improve facilities and infrastructure at Guadalupe Mountains National Park. An overall management concept was first developed for each action alternative. Consistent with its general concept, the action alternative was then designed so that it would meet all NPS general management planning goals and objectives and would facilitate meeting servicewide mandates and policies. Within this framework

- Alternative B would increase opportunities for a wilderness experience.

- Alternative C would focus on expanding visitor opportunities and experiences.
- The NPS' preferred alternative would incorporate "the best" elements of alternative B and alternative C. Development of this alternative is described later in this chapter under "Identify the Preferred Alternative." This alternative seeks a balance between providing enhanced visitor opportunities and increasing exposure to wilderness.

The action alternatives embody the range of what the public and the National Park Service want to see accomplished at Guadalupe Mountains National Park with regard to natural resource conditions, cultural resource conditions, visitor use and experience, and NPS management and operations at the park.

A number of management actions that were proposed by the public do not conform with NPS planning goals and objectives for Guadalupe Mountains National Park, or conflict with servicewide mandates and policies. These actions, which were not incorporated into any of the alternatives, are discussed later in this chapter under "Alternatives and Actions Considered but Dismissed from Detailed Evaluation."

### APPLYING MANAGEMENT ZONES

In formulating the alternatives, the management zones were placed in different locations or configurations on the map according to the overall concept of each alternative. That is, the management alternatives represent different ways to apply the management zones to Guadalupe Mountains National Park. For example, an alternative whose overall concept included having as much undeveloped backcountry as possible would have more land assigned to zones that involve lower levels of development than an alternative whose



overall concept was to increase access to the entire park.

There were limits regarding where the various zones could be applied. Specifically, only lands designated as wilderness by Congress could be assigned to the designated wilderness zone. Backcountry was applied only to the lands found eligible for future consideration as wilderness. Application of these two management zones in the park is consistent across all action alternatives.

The assignment of zones also was guided by the locations of existing facilities. For example, the Pine Springs and Frijole Ranch areas contain parking lots, buildings, and other features that already support visitor activities and administrative services. Therefore, these areas were assigned to the developed zone in all of the action alternatives. Similarly, the existing roads in the park were assigned to the motorized scenic corridor zone.

The National Park Service inventoried parkwide environmental data, including

natural, cultural, and scenic attributes. These resources were digitally mapped and recorded in a geographical information systems (GIS) database. This database was used to prepare composite resource and visitor experience analysis maps, such as the high resource values and landscape unit maps in Chapter 1, and the natural resource, vegetation, visual resource, and cultural resource maps in Chapter 3. The maps helped guide the assignment of management zones to areas of the park. For example

- Areas with high concentrations of natural or cultural resources were more likely to be managed for greater resource protection and with some limitations on visitor use than areas with low concentrations of these valued resources.
- Areas of high scenic quality that were visually exposed would be in a management zone that provided access to visitors while minimizing impact of development or other intrusions in the viewshed.



Shumard Canyon from Williams Ranch

The action alternatives in this general management plan are the different “pictures” of the park that could be painted with the available “colors” (management zones). Because the areas within the designated wilderness and backcountry zones cannot change among action alternatives and because these represent the largest zones by acreage in the park, the pictures at first appear quite similar. However, small changes in how the other zones are applied in the remaining areas of the park represent substantial changes in the type of experiences many visitors will encounter.

### CONSIDERING RELATIVE COSTS

The purpose of the cost estimate in a general management plan is to provide a sense of the cost to implement one alternative relative to the other alternatives considered. The presentation of costs in this plan is based on the types and general intensities of development in each alternative, staffing levels that would be required to fully implement the alternative, and non-development projects, including resource management activities.

The cost figures shown in Table 4 and after the discussion of each alternative were developed using NPS and industry cost estimating guidelines to the extent possible. Because actual costs could be higher or lower, these estimates should not be used for budgeting purposes. Project-specific costs

will be determined in subsequent, more detailed planning and design exercises, and will consider the design of facilities, identification of detailed resource protection needs, and changing visitor experience goals.

Actual costs to the National Park Service will vary, depending on if and when the actions are implemented, and on contributions by partners and volunteers. The implementation of the approved plan would depend on future NPS funding levels and servicewide priorities, and on partnership funds, time, and effort.

The approval of a general management plan does not guarantee that funding and staffing needed to implement the plan will be forthcoming. Full implementation of the plan could be many years in the future.

Because of the generalized nature of these cost estimates, costs in this general management plan are presented only in general categories. All costs were rounded to the nearest thousand dollars.

### Annual Costs and Staffing

Annual operating costs are the total annual costs for maintenance and operations associated with each alternative, including: utilities, supplies, staff salaries and benefits, leasing, and materials. Cost and staffing estimates assumed each alternative was fully implemented as described in this plan. The cost estimates were in 2011 dollars.

**Table 4: Costs of the Alternatives**

COST CATEGORY	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Total annual operating costs (2011)	\$2,901,000	\$2,901,000	\$2,901,000	\$3,681,000
Staffing in full-time equivalents	34	34	34	44
Deferred maintenance	\$1,584,000	\$1,360,000	\$1,508,000	\$998,000
Total one-time costs and nonfacility costs	\$1,835,000	\$9,620,000	\$5,786,000	\$15,831,000
Facility costs	\$410,000	\$6,675,000	\$3,111,000	\$12,061,000
Non-facility costs: resource management	\$1,425,000	\$2,475,000	\$2,475,000	\$3,300,000
Non-facility costs: interpretation and orientation	\$0	\$470,000	\$200,000	\$470,000

Total full-time-equivalent employees are the number of staff required to maintain the assets of the park at a good level, provide acceptable visitor services, protect resources, and administer the park. Park managers would also explore opportunities to work with partners, volunteers, and other federal agencies to manage the park effectively and efficiently. Full-time-equivalent salaries and benefits were included in the annual operating costs.

### **Deferred Maintenance**

Deferred maintenance costs are those needed to improve park assets to NPS standards. The estimate in this general management plan represents all of the deferred maintenance in the park as of 2012.

This estimate is a snapshot in time and will change over the life of the plan, as a result of regular, on-time maintenance programs and the availability of funds. Deferred maintenance is not a cost associated with implementing the alternatives, but could impact implementation over a period of time. While deferred maintenance is not a cost associated with implementation of the general management plan, it has an impact on the park budget and could have an indirect effect on implementation.

### **One-Time Cost Estimates**

Facility costs in this category are rough estimates, and were developed based on the average cost of similar facilities. Actual costs for one-time facility and non-facility projects may be higher or lower, depending on the final design, site conditions, and contracting agency. These cost estimates do not include all items that will be listed in the more inclusive estimates to be developed in subsequent planning efforts. In alternative A, one-time costs include only those costs already planned within existing programs and with an approved funding source.

## **IDENTIFYING THE PREFERRED ALTERNATIVE**

The development of the NPS' preferred alternative involved the use of an objective analysis process called "Choosing by Advantages." During a workshop held January 28 through 30, 2003, the planning team used this process to identify and compare the relative advantages of the then-existing alternatives (alternative A, alternative B, and alternative C) according to their ability to

- Protect natural resources, including preventing loss, and maintaining and improving conditions.
- Preserve cultural resources, including preventing loss, and maintaining and improving conditions.
- Provide for visitor experience and orientation through direct resources interaction.
- Enhance visitor experience, orientation, understanding, and appreciation through education and orientation.
- Promote wilderness experiences, values, and protection.
- Improve operational efficiency and sustainability.

This comparison helped the planning team determine the actions that would be most advantageous to the resources and the public. The costs of implementing the alternatives also were considered.

A summary of the workshop results is provided in appendix E. As shown in the appendix, alternative B initially was judged among the three initial alternatives to provide the greatest benefits in achieving the evaluation factors within the context of the mission and purpose of the park. This alternative was then improved by adding elements from the other two alternatives that increased benefits and/or decreased costs. The resulting preferred alternative would give the National Park Service the greatest overall benefits for each evaluation factor for the most reasonable cost.

## CHANGES FROM THE DRAFT TO THE FINAL

Certain clarifications and revisions to this FGMP/EIS are in response to public comments on the DGMP/EIS (see Appendix H: Agency Letters and Responses to Substantive Comments on the Draft General Management Plan and Environmental Impact Statement). In addition, some changes have been made to this FGMP/EIS to document those mostly routine actions that were identified in the DGMP/EIS that have already been completed and therefore have been removed from discussion. Also, there are some other actions that were presented in the DGMP/EIS that are consistent with the alternative concepts presented in the plan but have been deleted because it is unlikely they would be funded and accomplished within the timeframe of this plan. And finally, NPS procedures have changed related to analysis of potential impairment to park resources and values. These changes are discussed in Chapter 4 and referenced in appendix C.

### Completed or Modified Actions

Some actions considered by the planning team and discussed with the public were routine, primarily facility maintenance activities and visitor information activities, and were not actions normally included in a general management plan. Due to the length of time that has elapsed in the preparation of this plan, some of these actions have been completed by park staff and have been deleted from the plan. A few actions have been modified to better respond to resource conditions, park operations needs, or visitor needs. Where actions were completed and deleted, reference to them, including associated costs, and any specific impact analyses, have been removed from this final document. For modified proposed actions, the text has been revised to identify this action, costs revised as needed, as well as any specific impact analyses, as needed. In the case of the Manzanita Spring Study, this has been addressed in the “Alternatives or

Actions Considered but Dismissed from Detailed Evaluation” section at the end of this chapter.

### Completed and Deleted Actions

**Ship-on-the-Desert.** On page 87 of the draft plan, the proposal to develop a small administrative RV campground at Ship-on-the-Desert has been completed to support NPS operations and house volunteers. This proposal has been deleted from the plan.

**Interpretive and Educational Outreach Programs and Media.** On pages 91, 101, and 113 (all action alternatives) of the draft plan, some of the actions to enhance web page and other electronic media have been accomplished and are ongoing activities for the park. These actions have been deleted from the plan. Also, part of the proposal was to obtain digital audiovisual presentation equipment. This was done as part of another park project and has been deleted from the plan.

**Hunter Line Cabin.** On pages 89, 100, and 112 of the draft plan, the proposal was to stabilize and preserve the Hunter Line Cabin. The Hunter Line Cabin has been stabilized and this proposal has been deleted from the plan.

**Manzanita Spring Study.** On page 97 of the draft plan, the proposal for alternative B was to return the Manzanita Spring to natural conditions. A cultural landscape inventory report for Frijole Ranch was completed in 2006. The human-modified spring was found to be a historically significant component of the Frijole Ranch landscape. Consequently, that study has been deleted from the plan. See “Alternatives or Actions Considered but Dismissed from Detailed Evaluation” for discussion about the resulting dismissal of returning the Manzanita Spring to pre-ranching conditions based on the study results.

### Modified Actions

**Williams Ranch Access.** On page 87 in the preferred alternative of the draft plan, the

proposal was to enlarge the parking lot to accommodate 10 cars. Based on further analysis of conditions and needs, the park has determined that the amount of parking is not the problem for this alternative; it is the ability for vehicles to turn around. The revised proposal is to keep the current size of the parking lot and to construct a turnaround for vehicles. In alternative C, the improved accessibility and upgrades to visitor opportunities at the Williams Ranch would require the proposed enlargement of the parking area. A vehicular turn around would also be needed and has been added.

**Dog Canyon.** On pages 85 and 109 (preferred alternative and alternative C) of the draft plan, Dog Canyon upgrades included the construction of a small fire building for storage of equipment. Based on further analysis of park resources and conditions at Dog Canyon, the park has determined that a fire building would be a safety concern and there would unlikely be adequate staff for it. The priority is to enhance water storage and water pressure at Dog Canyon to improve fire protection capability (health and safety conditions).

**Museum Collections.** On page 85 under the preferred alternative of the draft plan, the proposal was to incorporate sufficient storage space within the consolidated headquarters and administrative building to keep most museum specimens within the park. On page 95 under alternative B of the draft plan, the proposal was to house some museum collections within the park as well as within regional facilities. These proposals are not consistent with the servicewide Museum Collections Storage plan. The purpose of the collections storage plan is to consolidate storage of museum collections to improve overall management of the collections in the National Park Service and to minimize cost. For this reason, the preferred alternative and alternative B have been modified so that the proposed actions in the alternatives will be consistent with the servicewide plan. Under both alternatives the majority of the collections would be

housed in approved collection repositories. Representative samples of the collection would remain in the park for research, training, and interpretive purposes. Storage of the representative samples would be consistent with applicable preservation and security standards.

**The Pinery Area and Butterfield Stagecoach.** On pages 80 and 107 (preferred alternative and alternative C) of the draft plan, the proposal to build a small new exhibit structure near the Pinery Ruins to house the Butterfield Stagecoach has been deleted. The stagecoach could be returned to the park from off-site loan and displayed and protected in the remodeled visitor center once offices were relocated into a new park administrative building.

#### **Actions Not Carried Forward but Consistent with Final GMP/EIS**

Certain actions presented in the Draft Plan/EIS, while consistent with the objectives of the plan in general and one or more of the alternatives in particular, have not been carried forward as actions under the alternatives and therefore have not been included in the cost estimate for the alternative(s) nor have the impacts of these actions been analyzed in Chapter 4. In comparison with the other actions for potential implementation, these actions are lower in priority and unlikely to be implemented during the timeframe of this plan. If in the future the resources became available to implement these actions, it would be necessary for the Park staff to complete any necessary environmental compliance prior to implementation of the actions. However, because these actions are already consistent with the general management plan, no amendment to the plan would be required. [Note: for alternative C, the concept and the scale of the alternative actions assume in most cases that funding would be available within the timeframe of the plan; therefore, most actions are retained to support the concept.]

Actions not carried forward include the following:

**Guadalupe Pass Trailhead.** On page(s) 87, 102, and 110 (all action alternatives) of the 2008 draft plan, the improvement of the Guadalupe Pass trailhead has not been carried forward. This includes such improvements as an enlarged parking lot and improved signage, trail kiosk, and seating. The park needs to work with adjacent land owners first to obtain formal access to the trailhead through their land.

**McKittrick Canyon and Pratt Cabin.** On page 85 of the draft plan, the proposal to possibly develop new minimum impact sanitary facilities in McKittrick Canyon has not been carried forward. Also, on pages 85, 90, and 108 (all action alternatives) of the 2008 *DGMP/EIS*, cultural landscape rehabilitation and repairs to the Pratt Cabin and its surrounding landscape have not been carried forward. The University of Arizona has recently completed documentation of the historic landscape. Only routine repairs are needed to the roof. Routine management of the landscape will be needed, including fire protection.

**McKittrick Canyon and Powerline.** On page(s) 71, 85, 98, and 110 (all alternatives) of the draft plan, the proposal to remove the powerline in McKittrick Canyon will not be carried forward. Further environmental compliance will be conducted should funding become available in the future. At that time, the NPS will analyze the USFWS recommendation that the park should consider leaving powerline poles up for potential raptor roosting and feeding sites and locations for placing nesting platforms.

**PX Well Access and Trailhead.** On pages 87 and 110 (preferred alternative and alternative C) of the 2008 *DGMP/EIS*, the road, parking, and trailhead amenity improvements for the PX Well trailhead have not been carried forward. The preferred alternative proposal includes improving the road to accommodate lower clearance vehicles and providing signage and

developing a parking lot at the trailhead. The alternative C proposal is to also provide a primitive camping facility. Before this work and the related environmental analysis is pursued further, the park would need to work with adjacent land owners to obtain formal access through their land.

**Dog Canyon.** On pages 85 and 98 (preferred alternative and alternative B) of the draft plan, upgrades to Dog Canyon visitor amenities have not been carried forward. These amenities included improvements to the visitor contact station and upgrades to the trailhead, tent campsites, and interpretive exhibits.

**Butterfield Stage Route.** On pages 89, 100, 112 (preferred alternative, alternative B, and alternative C) of the draft plan, the delineation of the Butterfield Stage Route to improve visitor's ability to locate and follow the route has not been carried forward.

**Dell City.** On pages 87 and 99 (preferred alternative and alternative B) of the 2008 *DGMP/EIS*, a variety of improvements to the Dell City visitor contact station have not been carried forward. This included remodeling of the storefront and developing new exhibits. The future need for this action will be dependent on the Salt Dunes orientation and access decisions, implementation, and visitor response. Currently the Dell City location is unstaffed and has low visitation.

**Historic Structures and Landscapes.** On page 89 and 112 of the Draft GMP/EIS (preferred alternative and alternative C), the Cox and Bowl cabins would be studied for national register eligibility and would be retained as discovery sites. The proposal to potentially remove the structures and restore their sites has not been carried forward.

**Frijole Ranch.** On pages 84 and 97 (preferred alternative and alternative B) of the 2008 *DGMP/EIS*, the rehabilitation of Frijole Ranch House to a turn-of-the century house and new interior exhibits on

pioneer ranching have not been carried forward. Before this rehabilitation could be completed, other actions would need to occur, such as the visitor center remodel.

### IMPLEMENTING THE GENERAL MANAGEMENT PLAN

The alternatives focus on *what* resource conditions and visitor uses, experiences, and opportunities should be available at Guadalupe Mountains National Park rather than presenting details of *how* these conditions and uses or experiences should be achieved.

More detailed plans or studies will be required before most conditions proposed

in the alternatives are achieved. Many of these are identified later in this chapter under the heading “Future Studies, Implementation Plans, and Research Needed.”

The implementation of any alternative also depends on future funding and completion of environmental compliance, as appropriate. There is no guarantee that the money needed to implement this general management plan will be available. This plan establishes a vision of the future that will guide day-to-day and year-to-year management of Guadalupe Mountains National Park, but its full implementation could take many years.



Patterson Hills – Salt Flat from Guadalupe Peak

## ALTERNATIVE A: NO ACTION / CONTINUE CURRENT MANAGEMENT

### CONCEPT

This alternative would extend the conditions, visitor services, and management practices as they currently exist at Guadalupe Mountains National Park into the future. Current visitor facilities and park infrastructure would stay in their existing locations. As shown in the Alternative A – No Action Management Zones map, the park would continue to provide limited areas that visitors can easily access and experience by vehicle, with much larger areas of the park that visitors could access and experience with considerable effort and challenge. Cultural resources would continue to be protected and maintained in a stable condition.

No management zoning is identified in alternative A, no action / continue current management. This alternative represents a continuation of existing park management practices that call for park lands outside developed areas to be managed as “backcountry,” a designation that is similar to the designated wilderness and backcountry zones of the action alternatives.

### FACILITIES AND ASSOCIATED VISITOR ACTIVITIES

#### Pine Springs

Pine Springs, at the mouth of Pine Springs Canyon, would continue to be a primary visitor destination point for most day-use, overnight camping, and interpretive activities. This busy area would be conveniently accessed by all ground transportation modes. Visitors would experience frequent encounters with many other visitors and interaction with park staff would be common.

**Visitor Center Area.** The visitor center is located about 0.2 miles northwest of U.S. Highway 62/180. Under alternative A, the

visitor center would be maintained in its current configuration. This building is in relatively good condition. Within this building, the following uses would continue:

- visitor services, including orientation to the park
- park headquarters and other administrative uses
- some collections storage

This alternative would not involve any changes to the displays within or outside the visitor center. The displays are relatively modern, accurate, and in good condition. They would continue to provide an introduction to and basic understanding of the park’s geological and natural history. The primary interpretation of the park’s cultural resources would continue to occur at Frijole Ranch. Because the visitor center represents the only park experience of many visitors, particularly those who stop as they travel through the region on U.S. Highway 62/180, these people would continue to miss most of the interpretation of the park’s important cultural resources.

The bookstore at the visitor center would continue to be an important source of more in-depth information on the park’s resources. These include not only the geological, natural, and cultural resources that were introduced at the visitor center, The Pinery (see below), and Frijole Ranch, but other topics such as American Indians; other history of the area; wilderness resources, including values and ethics; and night skies. A wide selection of books and educational materials on the park and region would continue to be available at this facility.

The parking area south of the visitor center provides for bus and personal vehicle parking for the visitor center and adjacent picnic area. During busy periods, such as spring and autumn weekends, this parking lot is used as overflow parking by day-users and backpackers when the Pine Springs



Trailhead parking lot is full. A picnic area located south of this parking lot supports day-use near the visitor center.

**The Pinery Area.** The Butterfield Stage Station Ruins, also called the Pinery, is located about a quarter mile east of the visitor center. This site is listed in the National Register of Historic Places and provides the cultural landscape associated with the operation of a stagecoach line in the late 1850s. The Pinery is directly accessed from U.S. Highway 62/180 and has its own, six-space parking lot. The 0.3-mile-long, paved, wheelchair-accessible Pinery Nature Trail connects the Butterfield Stage Station Ruins and the visitor center and provides interpretation of the Chihuahua Desert vegetation. All of these facilities would be maintained with the implementation of alternative A.

**Pine Springs Trailhead Area.** The trailhead is located at the northwest end of the Pine Springs area. This is the primary trailhead in the park and is a starting point for the Guadalupe Peak, El Capitan, Tejas, Frijole, and Foothills Trails. These connect to other trails, such that virtually the entire trail system through the interior of Guadalupe Mountains National Park can be accessed from Pine Springs. As a result, this is the main trailhead for overnight parking for backpackers.

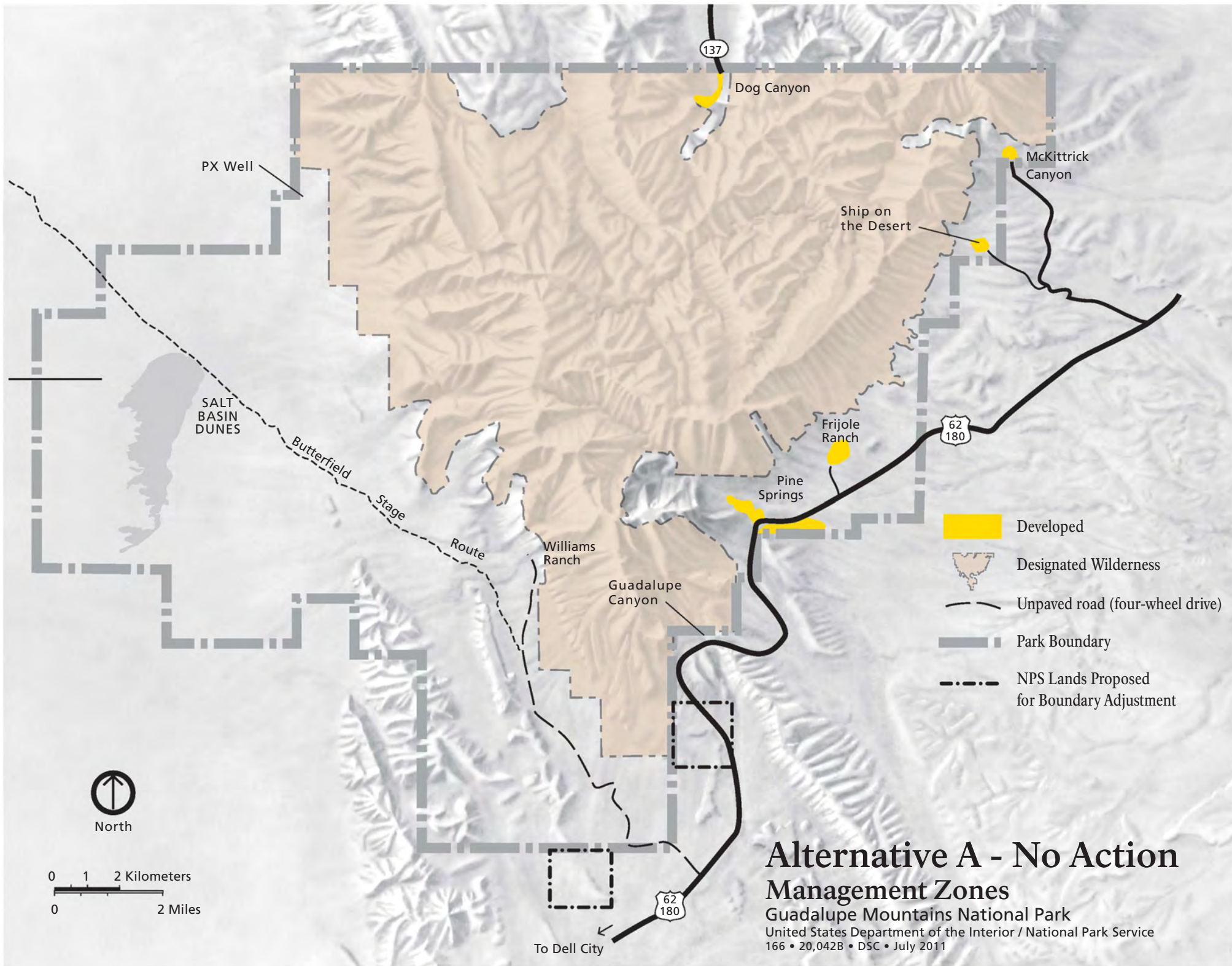
Parking and picnic tables are provided on a loop road at the trailhead. The original intent was to provide day-use and parking for day-hike and overnight trail users close to the trailhead. However, a tent camping area has evolved adjacent to the trailhead parking lot and picnic area that provides private-vehicle tent camping and two group campsites. Visitors access the tent camping via a gravel road from the trailhead parking lot, and park adjacent to or near their tent site. The visitor center can be accessed using the 0.2-mile-long Campground Trail.

Over time, the trailhead parking and picnic area evolved into a *de facto* campground for recreational vehicles. The recreational

vehicle sites are defined by painted lines and numbers on the parking lot pavement. This use by recreational vehicles restricts the parking available for day hikers and backpackers. A comfort station on the perimeter of the trailhead / parking lot adequately serves trail users and the camping areas. There are no hookups or dump stations.

The issues associated with the trailhead area, all of which would continue under alternative A, include the following.

- Only limited parking is available for day hikers and backpackers at the trailhead. When the trailhead parking is full, these park users are directed to the visitor center parking lot.
- The capacity of the *de facto* tent and recreational vehicle campgrounds is exceeded often in the spring and autumn. When this occurs, the additional campers are directed by NPS staff to other campgrounds operated by private entities in nearby communities, or to public lands on the Lincoln National Forest-Guadalupe District or Bureau of Land Management lands, both of which are located nearby in New Mexico.
- The large size of many recreational vehicles and their concentration in a small area causes a visual intrusion and creates safety concerns. The two group campsites are close to the single campsites in the tent campground. These most commonly are used by university/college groups and groups of adults associated with an organization like the Sierra Club. Because of the large number of people, noise from these campsites typically is greater than noise from the nearby single sites and sometimes can be disturbing to other visitors.



- The parking lot was not designed for overnight camping. There are no picnic tables or hookups, and recreational vehicle users do not even have space to set out a lawn chair. The low level of support facilities may lead to a low-quality experience for visitors in recreational vehicles who use the trailhead parking lot for camping.

**Administrative Facilities.** Under alternative A, Pine Springs would continue to serve as the park headquarters and maintenance center. Issues associated with administrative and other support facilities in this area would continue to include the following.

- Although more than half of the visitor center building is occupied by NPS staff offices and museum storage, the space available is too small for both purposes. Moreover, continued use of the building for these purposes precludes opportunities to expand visitor services in the building.
- Twenty-two housing units near the maintenance area ensure round-the-clock staff availability. Because there is inadequate office space, two of the largest housing units have been converted to administrative use. This has reduced the available housing in the park by about 15 percent, which diminishes the ability of the National Park Service to provide after-hours services, park protection, and emergency response. It also limits operational flexibility, including the ability to hire seasonal staff, effectively use volunteers, develop partnerships, and take advantage of the services offered by groups such as the Student Conservation Association and Youth Conservation Corps.
- Currently, all cultural interpretive exhibits are housed at a location separate from the visitor center that is only open part of the time. This limits the ability of visitors to see the cultural exhibits and learn about the history of the area. Building a new headquarters would provide additional space in the visitor center for these cultural exhibits. In addition to being more visible, the exhibits would be more available to visitors because the visitor center is more consistently staffed than the current exhibit location.
- The current visitor center and headquarters facility lacks flexibility to meet other interpretive needs, such as space for environmental education and outreach education. Because the park is so remotely located, a multipurpose space is needed to accommodate these needs.
- Museum storage is inadequate in the existing facility. Some museum items are being stored in a separate facility that lacks environmental controls.
- Currently, offices for Resource Management staff members are located in a three-bedroom house. The house was not designed for this purpose, and the inappropriate layout limits the ability to perform wet and dry laboratory work. Also, there is inadequate space for maps, plans, and geographical information system (GIS) workstations.
- Similar problems associated with inappropriate layout are encountered by Visitor Protection and Wildland Fire Management staff members, who are located in another three-bedroom house.
- The location of these operations separate from headquarters creates inefficiencies, as staff must travel milestone mile to attend meetings or consult with other staff. This also results in higher vehicle and gasoline costs. These remote locations require special connections to provide computer access to network servers and result in higher utility costs, for example, for multiple business phone hook-ups.

#### **Frijole Ranch**

Frijole Ranch would continue to be a visitor destination for day-use opportunities.

Conditions that would continue include the following:

- The primary introduction to the park's major cultural and historical themes would remain at the museum in the Frijole Ranch house. This would continue to be available to the public only when volunteers were present. In addition, visitors who made only a single stop in the park, at Pine Springs, would miss an introduction to the park's cultural resources.
- The site's trailhead would provide direct access to the Frijole Trail, and Foothills Trail, which connect to other trails that provide access to the interior of the park.
- The Smith Spring Trail would continue to be wheelchair accessible from the trailhead to Manzanita Spring, and would provide an easy loop walk past Smith Spring for all other hikers.
- Manzanita Spring would be dredged periodically to remove accumulated sediment and maintain an open pond.
- The public corral would remain adjacent to the Frijole Ranch Road.

Actions currently are underway at the Frijole Ranch complex to restore the cultural landscape and improve visitor amenities. Because they are in progress, these improvements would be included in alternative A (and all of the action alternatives). They include:

- constructing a new gravel-surfaced parking area about a quarter-mile from the complex that would have space for 20 automobiles and 3 recreational vehicles
- constructing a new, eight-site picnic area with potable water near the parking area, with one van-style wheelchair-accessible site
- installing a hard-surface path (suitable for use by people with impaired mobility) from the parking area to the ranch complex

- providing new interpretive and trailhead signs
- replacing the chemical toilet with a permanent, vault-type toilet (suitable for use by people with impaired mobility)
- relocating the NPS' pack stock horse corrals away from Frijole Ranch to a site near the Pine Springs administration area south of U.S. Highway 62/180
- revegetating the areas from which facilities were removed

### **McKittrick Canyon**

McKittrick Canyon would continue to be a visitor destination for day-use opportunities. Conditions that would continue include the following:

- Access to McKittrick Canyon would be for day-use only.
- The site would serve as a trailhead, providing direct access to the Permian Reef Geology Trail and the McKittrick Canyon Trail, which connects to the Tejas Trail and the interior of the park. Beyond Pratt Cabin, the McKittrick Canyon Trail would be managed as a wilderness trail.
- Orientation and interpretation would occur at the visitor contact station. Interpretation also would be provided along the loop McKittrick Nature Trail.
- Pratt Cabin would continue to be preserved and used intermittently as an interpretive center without any water or toilet facilities.

### **Dog Canyon**

Dog Canyon would continue to provide a more remote setting for day-use opportunities and overnight camping. Conditions that would continue include the following:

- Visitors would receive orientation and interpretation at the visitor contact station.
- The trailhead would provide access to the interior of the park via the Tejas and

Bush Mountain Trails. The 0.6-mile-long, loop Indian Meadow Nature Trail would provide interpretation to visitors.

- Visitors could camp in the nine tent sites and four recreational vehicle sites. Picnicking would continue in the campground. All visitors would have access to the site's restrooms, which have potable water and flush toilets.
- Visitors with horses could keep them in the public horse corral, and the NPS would maintain its pack horse facilities in this area.
- The water storage system would remain at its current size of 10,000 gallons.

### **Salt Basin Dunes**

Salt Basin Dunes would continue to be maintained as a remote, limited-access visitor destination for day-use. Conditions that would continue include the following:

- Visitors could access the Salt Basin Dunes by a 2-mile hike from the park boundary, or by obtaining a permit that enabled them to enter the park by automobile and travel about 1 mile on a primitive access road, park in the small interior parking area, and hike a 1-mile trail to the dunes.
- There would not be any interpretive exhibits.
- The absence of services or facilities limits visitor satisfaction and understanding.

### **Williams Ranch**

Williams Ranch would continue to be accessible only by a high-clearance, 4-wheel-drive road. Use of the road would be by permit only, and use of Williams Ranch would be limited to day-use. The Williams Ranch house and cultural landscape would continue to be maintained as a historic structure and site.

### **Other Visitor Facilities**

**Ship-on-the-Desert** would continue to be used as a meeting facility and as quarters for

Volunteers-in-Parks and visiting researchers.

**PX Well** would continue as a remote historic remnant that is accessible only by trail.

The **Dell City contact station** would remain as is, with no staff, few exhibits, and little interpretive material.

The **Guadalupe Pass trailhead** is an access point to Guadalupe Canyon and the Salt Basin Overlook Trail. This access would continue to occur from a small, unmarked highway pull-out at Guadalupe Pass and would cross private land along the old highway right-of-way by an informal agreement with the land owners.

## **NATURAL RESOURCES**

Natural resource management would emphasize creating stable ecologic health and function conditions.

The management of threatened or endangered species and other species of concern would continue to be in compliance with requirements and direction from federal and state laws and regulations, and with NPS policy. Other native species of management concern, such as rare, declining, sensitive, or unique species and their habitats, would continue to be managed to maintain their natural distribution and abundance. Native species populations that have been severely reduced or extirpated from the park, such as desert bighorn sheep, pronghorn antelope, and black-tailed prairie dogs, would be restored where feasible and sustainable.

Air quality also will be managed in conformance with federal and state laws and regulations, and with NPS policy. Awareness of air quality and the measures that individuals can implement to maintain and enhance air quality would be improved through public education. The park staff would continue working with government and other entities throughout the region to

increase awareness regarding the importance of air quality and factors it affects, including visibility, human health, ecosystem health, and resource protection.

### **Wilderness**

This alternative would not include zoning. However, most of the park outside developed areas would be managed to protect wilderness values and opportunities for wilderness experiences. The existing tent pads would be maintained at the 10 designated backcountry campsites. Wilderness ethics and “leave no trace” standards would continue to be emphasized for all wilderness activities.

The lands on the west side of the park that were acquired following Congressional authorization in 1988 have been assessed for wilderness eligibility, and areas formerly excluded from wilderness, such as the northeastern slopes of Guadalupe Peak (including trail), Bear Canyon, the Patterson Hills, and western bajadas, have been reassessed (see appendix D).

### **Geological and Paleontological Resources**

Geological resources and paleontological resources would continue to be protected, as follows:

- The existing cave permitting system would be maintained to regulate, control, and restrict cave access.
- Specific stratotype and fossil locations would be protected by continuing limitations on access.

### **Plants and Wildlife**

The goal of all management actions for plants and wildlife within the park would be to develop and maintain a healthy, dynamic, naturally functioning ecosystem, characteristic of the Guadalupe Mountains environment. To the extent possible, this ecosystem would have its diversity fully restored, including animals, plants, and biological interrelationships currently missing. Where possible, fire would be

allowed to resume its natural role on the landscape of Guadalupe Mountains National Park. The park’s cultural and natural resources would be protected through the use of wildland fire, prescribed fire, and suppression, as described in the park’s fire management plan (NPS 2005).

**Management of Human-Disturbed Ecosystems.** Human-disturbed ecosystems would be allowed to restore naturally or as staffing permits. Specifically

- Access would be managed, and areas would be closed as necessary to allow areas to recover.
- Tent pads would be maintained at backcountry campsites.
- Previously grazed areas would be allowed to recover naturally.

**Management of Exotic Species.** The management of populations of exotic plant and animal species would be undertaken wherever such species threatened park resources or public health. This could include eradication, and may be applied to aoudads, a species of sheep that is native to North Africa.

Target species of exotic plants would be eradicated. In addition, plant and animal species and communities would be protected from impacts from exotic species by the continued implementation of preventive measures.

- Horse use (a possible vector in the spread of exotic species) would continue to be allowed but in backcountry areas it would be limited to day-use on designated trails.
- Conditions would be created for natural revegetation.

**Management of Wetland and Aquatic Environments.** There would not be any changes in the management of wetland and aquatic environments. Most would continue to be protected as natural ecosystems. Undeveloped springs and wetlands would be protected for their value to wildlife.



### **Management of Research Natural Areas.**

Research natural areas would continue to be managed in a manner consistent with NPS standards for resource protection, monitoring, and scientific study. All research natural areas in the park would be retained at current sizes and configurations. These areas would continue to be managed as a future resource research bank with no visitor access allowed.

### **Water Quality and Quantity**

Water quality and quantity would continue to be protected. This would include inventorying current resources to establish a baseline against which future conditions can be compared to determine change. Park staff would continue to work with outside interests and parties to eliminate or mitigate degradation of the park's surface and groundwater supply.

## **CULTURAL RESOURCES**

Management would continue to focus on protecting and maintaining the stable condition of cultural resources.

### **Ethnographic Resources**

Ethnographic resources would continue to be managed in compliance with requirements and direction from federal and state laws and regulations, and with NPS policy. In addition, the National Park Service would strive to improve its understanding of local ethnographic conditions and work with American Indians to protect and/or improve those conditions.

### **Archeological Resources**

Archeological sites would be protected. The continuation of existing management practices would include the following.

- Visitor access to sites would not be provided.
- Stable conditions would be determined by monitoring.

- Minimum impact visitor use education programs would be developed, including "leave no trace" and sustainability.
- Facilities would be removed and appropriate mitigation would occur, or areas would be closed to visitor use if archeological resources were degraded.

### **Historic Structures and Landscapes**

Historic structures and landscapes throughout the park would continue to be preserved while providing appropriate access. Most cultural sites in the backcountry would be managed as discovery sites. Most remnants of historic ranching activities would remain and would be stabilized for visitor safety, if required.

The management of historic structures and landscapes associated with visitor facilities throughout the park was described previously under the heading "Facilities and Associated Visitor Activities." The management of sites that were not addressed as part of visitor facilities would be as follows.

- The Butterfield Stage route would continue to be a discovery site.

### **Collections**

The National Park Service would continue to store the park's museum collections in a manner that was consistent with NPS preservation and security standards. However, because of the lack of space within the park that met the specialized storage requirements of museum collections, some of the existing and/or new specimens could be moved to alternate locations, potentially including universities and museums.

## **VISITOR USE AND UNDERSTANDING**

There are multiple aspects to visitor use and understanding, including

- visitor experience

- visitor education, interpretation, and orientation
- interpretive and educational outreach programs and media
- visitor access, parking, and circulation
- hiking trails, trailheads, and horse use

Many elements of visitor use and understanding already have been described in other elements of alternative A, particularly including “Facilities and Associated Visitor Activities.” To avoid repetition, this section focuses on the broad nature of visitor use and understanding that would be associated with this alternative, plus features that contribute to visitor use and understanding that were not covered previously. Lists are used to summarize features that were covered in other sections.

Under this alternative, visitor understanding would continue to be based on the opportunities to develop an appreciation of the park’s primary themes.

### **Visitor Experience**

Visitors would continue to receive a park introduction and a basic understanding of the park’s geological and natural history at the Pine Springs visitor center. Their introduction to the major cultural and historical themes would continue to occur at the Frijole Ranch house.

An understanding of wilderness values and leave no trace standards would be available to all visitors seeking a back country experience either through day hikes or overnight excursions (by permit) into the park’s backcountry, visitors would continue to have opportunities to learn about wilderness values and ethics through park interpretive activities.

Campers at most levels, including recreational vehicle users, would have an opportunity to understand the value and importance of clear night skies and explore them relatively free of light and air pollution.

### **Visitor Education, Interpretation, and Orientation**

Education, interpretation, and orientation opportunities would continue to be provided primarily at existing, centralized visitor facilities. Most visitor interpretive activities would continue to be at the Pine Springs visitor center. Interpretation and education also would occur at the Frijole Ranch museum and at contact stations in McKittrick Canyon, Dog Canyon, and Dell City. There would not be any changes in wayside exhibits. Pratt Cabin would continue to be used intermittently as an interpretive center in McKittrick Canyon. Ship-on-the-Desert would continue to be used for education programs, meetings, and quarters for researchers.

### **Interpretive and Educational Outreach Programs and Media**

Education, interpretation, outreach, and orientation programs and media would continue to offer a variety of nonpersonal and personal programs to park visitors and regional schools and groups. Specifically

- Interpretive walks, topical programs, and evening presentations would continue to be provided.
- Programs at regional schools would continue.
- Publications and audio/visual presentations would be updated or replaced as needed.

### **Visitor Access, Circulation, and Parking**

Overnight access would occur only at Pine Springs, Dog Canyon, and in the backcountry primitive campsites. All other parts of the park would be for day-use only.

Park roads would continue to provide vehicular and visitor access from highways and roads. New roads would not be built and existing roads would not be upgraded. The Williams Ranch road would remain accessible only by high-clearance vehicles and would be available by permit only.



Access to the Salt Basin Dunes would continue to be available by parking at the park boundary and hiking in about 2 miles, or by obtaining a permit to access the vehicle staging location about a mile inside the boundary and hiking a mile to the dunes.

Alternative A would not include any changes to parking facilities, except at Frijole Ranch, as described earlier, that are already underway and would be included in all of the alternatives.

### **Hiking Trails, Trailheads, and Horse Use**

Hiking trails would continue to provide the primary means of access to the interior and upland areas of the park. No new trails or trailheads would be built, and existing facilities would receive maintenance as needed. Visitor use levels would continue to be managed in the backcountry zone with an overnight permit system so that primitive, solitary conditions could be maintained.

- Hiking trails would provide access to most park users. Trails outside of developed areas would remain narrow and primitive in character. Selected trails could be closed or rerouted to improve visitor and staff safety and/or enhance resource protection.
- Existing trailheads would provide vehicular access to park trails and destinations. Trailheads would be maintained as minimally improved facilities.
- Horseback riding would continue to be allowed on some of the park's interior trails, while other trails would be for hiking only. Horse use in the backcountry would be limited to day-use only. Public corrals would be available at Dog Canyon and Frijole Ranch.

### **PARK OPERATIONS**

Many elements of park operations already have been described in other elements of alternative A, particularly including "Facilities and Associated Visitor Activities."

To avoid repetition, this section focuses on elements of operations that were not covered previously.

Park visitor and operations buildings would remain in the existing locations and configurations. Facilities would be maintained at current conditions. No new facilities would be anticipated. In addition to features described earlier for this alternative

- The Pine Top patrol cabin would remain.
- No sanitary facilities would be provided in backcountry.
- There would not be any commercial services planning.

### **BOUNDARY ADJUSTMENT**

A boundary adjustment would be sought to include the two parcels of NPS-owned land currently outside and adjacent to the legislated park boundary. These parcels contain important geologic and paleontological resources that are connected to the park's purpose and significance.

### **COSTS**

The estimated costs to fully implement alternative A were shown in table 4. The costs in the table provide a relative sense of the resources necessary to implement this alternative. The cost estimate has been rounded to the nearest thousand dollars. These estimates should not be used for budgetary purposes. In the no-action alternative, only those projects with identified funding have been included in the cost estimate.

The total one-time cost to implement alternative A would be \$1,835,000. Of this, \$410,000 would be for one-time construction costs, including work at Frijole Ranch to rehabilitate the ranch house and improve the picnic area. Other construction-related activities would include improvements to the Williams Ranch road.

One-time costs not associated with park facilities would include resource management to control exotic species, and improvements to interpretation and orientation materials. One-time costs for resource management would be \$1,425,000, and there would be no cost for interpretation and orientation.

Annual operating costs for the park would be covered within the estimated 2011 base budget of \$2,901,000.

The total number of full-time-equivalent staff would be 34; no additional staff would

be required. Under this alternative, most actions, including all field work, would be completed with full-time NPS staff.

The total amount of deferred maintenance in the park would be unlikely to change as a result of implementing this alternative. This could have an impact on the NPS' ability to address some deferred maintenance actions, and could affect implementation of priority actions that otherwise potentially would be funded from the park budget.

## PREFERRED ALTERNATIVE

### CONCEPT

The preferred alternative would emphasize wilderness values and restoring natural ecosystem processes, while expanding some opportunities for visitors to enjoy easier access to park settings than currently exist. Specifically:

- Large areas of the park would be zoned as designated wilderness and backcountry (assessed as eligible for wilderness). In these areas, visitors would experience a wilderness situation.
- There would be a wider range of overnight and multi-day destination opportunities.
- Visitors who did not enter the backcountry or designated wilderness zones could gain an understanding of wilderness values indirectly through enhanced interpretive presentations within the more developed and more easily accessible zones.
- Visitors would have greater developed day-use and overnight opportunities with improved facilities, greater accessibility, and enhanced exhibits.
- Cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated and protected from impacts. This would be achieved in part by actively managing visitor access in some areas.

The preferred alternative would combine preserving wilderness areas and natural settings with providing a wider spectrum of accessible settings and experiences. As shown in the Preferred Alternative Management Zones map, wilderness threshold zoning would provide for transitions between frontcountry and designated wilderness or backcountry zones. The areas zoned as frontcountry would include most of the areas adjacent to or surrounding developed areas and would

include lands near Pine Springs and Frijole Ranch; the area adjacent to and surrounding the new Salt Basin Dunes staging area; the old Signal Peak housing area, which is in one of the two NPS-owned land parcels that would be included in the boundary change; and areas near Williams Ranch; PX Well and Guadalupe Pass. These areas would provide some transition from developed to natural settings while also providing larger numbers of improved access points for areas zoned as backcountry and designated wilderness.

### FACILITIES AND ASSOCIATED VISITOR ACTIVITIES

#### Pine Springs

**Management Zoning.** The management zones that would be applied to the Pine Springs area are shown in the Preferred Alternative Management Zones map.

- The areas of the existing visitor center, parking lots, trailhead, tent campground, picnic areas, and Butterfield Stage Station Ruins (the Pinery) would be designated as developed zone.
- The area south of U.S. Highway 62/180 that currently contains the maintenance area and staff housing also would be assigned to the developed zone. Few visitors would enter this area, where the focus would be on providing administrative and support services.
- The land north and east of Pine Springs, extending to Frijole Ranch, would be within the frontcountry zone.
- The wilderness threshold zone would be applied to the land south of the developed area and west of U.S. Highway 62/180 (the mouth of Pine Springs Canyon). This area would provide a transition between the area of heavy visitor activity and the designated wilderness to the southwest.

- The area west of the developed zone that generally is bounded by the Guadalupe Peak Trail on the south and the ridgeline of Guadalupe Peak on the west (the upper reaches of Pine Springs Canyon) has been found eligible for future consideration as wilderness. Therefore, this area was included in the backcountry zone.
- Once a site has been identified as a developed zone for the campground in the Pine Springs area, it will be added to the zoning for Pine Springs or Frijole Ranch.

**Visitor Center Area.** The visitor center and associated parking lot and picnic area at Pine Springs would continue to be a primary visitor destination point for day-use, for visitors who make a single, park-related stop as they travel through the region on U.S. Highway 62/180.

In the near term, the visitor center would be maintained in its current configuration. However, when funding became available, a new, consolidated park headquarters and office complex would be constructed south of U.S. Highway 62/180 close to the maintenance area. The park interpretive staff would remain in the visitor center, but other staff functions would be moved out of this building.

The removal of administrative offices from the Pine Springs visitor center would provide space for expanded visitor facilities and services. Some minor repairs or upgrades to the building might be made, but the structure generally is in good condition. The visitor center would be improved as follows:

- Enhanced exhibits would provide an improved understanding of the park's geological and natural history
- Displays would include more emphasis on the ecological importance of wilderness, wilderness management in the park, and wilderness values and ethics.

- New cultural resource exhibits, which would include information and pieces from the cultural resource museum at Frijole Ranch, would be developed and installed to provide visitors with an appreciation of human history in the area. Also, the Butterfield Stagecoach (on loan due to no available space at the park currently) could be displayed in the remodeled visitor center.
- The natural and cultural / historical themes would be related in a more comprehensive presentation.
- The visitor center building would be redesigned to include program rooms and/or classrooms for seminars and other educational activities or group events.
- The bookstore may be expanded.
- New audiovisual technology would present park themes, information, and values. For example, video technology could be used to present trips in the park's wilderness areas for those unable to access it directly.

An exhibits plan would be prepared to determine the content and most appropriate presentation methods for conveying the key themes of Guadalupe Mountains National Park to visitors.

**The Pinery Area.** At this area, a new exhibit building would be constructed to exhibit the stagecoach that is owned by the park and currently is on loan because there is no place on site to display it. Otherwise, facilities and management of the Butterfield Stage Station Ruins would not change from the no action alternative.

**Pine Springs Trailhead Area.** Existing tent camping near the canyon trailhead would continue. However, camping from vehicles, including recreational vehicle camping and group camping, would be moved to another location within the Pine Springs or Frijole Ranch frontcountry zone.

Overnight camping would be prohibited in the trailhead area. The parking lot would be

available only for day-use and for overnight parking of the empty vehicles belonging to hikers who were making multi-day hikes to the interior of the park. As a result of this action, parking and picnic tables would be more available for day-users, and picnicking may become more common in this area. This action also would make more parking available for hikers and backpackers and would reduce their use of the visitor center parking lot during busy seasons.

**New Campground.** The preferred alternative would include the construction and operation of a new, developed campground in the frontcountry zone in the vicinity of Pine Springs or Frijole Ranch. A detailed development concept plan would be prepared for this facility, but as currently envisioned, the campground would include the following:

- About half the campsites would be designed for cars with tents.
- About half would be pull-through recreational vehicle sites with electrical hook-ups.
- There would be two to four group campsites with adjacent vehicle parking.
- Support facilities would include modern restrooms and showers, and a sanitary dump station.

The campground may be located in an area that has not been extensively disturbed by past development. However, careful siting would be done to avoid sensitive resources, such as archeological sites and populations of special-status (such as endangered or threatened) species. Avoidance of areas prone to flash flooding also would be an important site selection criterion. In siting the campground, planners would take maximum advantage of the substantial volume of resource survey work that already has been done in the vicinity of Pine Springs and Frijole Ranch.

This campground could be run by the National Park Service, or by a concessioner. An evaluation of the optimal approach for

operating this facility would be included in a commercial services plan that would be prepared by the National Park Service as part of the preferred alternative. Regardless of the operator, the campground would not include other facilities, such as a gasoline station or a store.

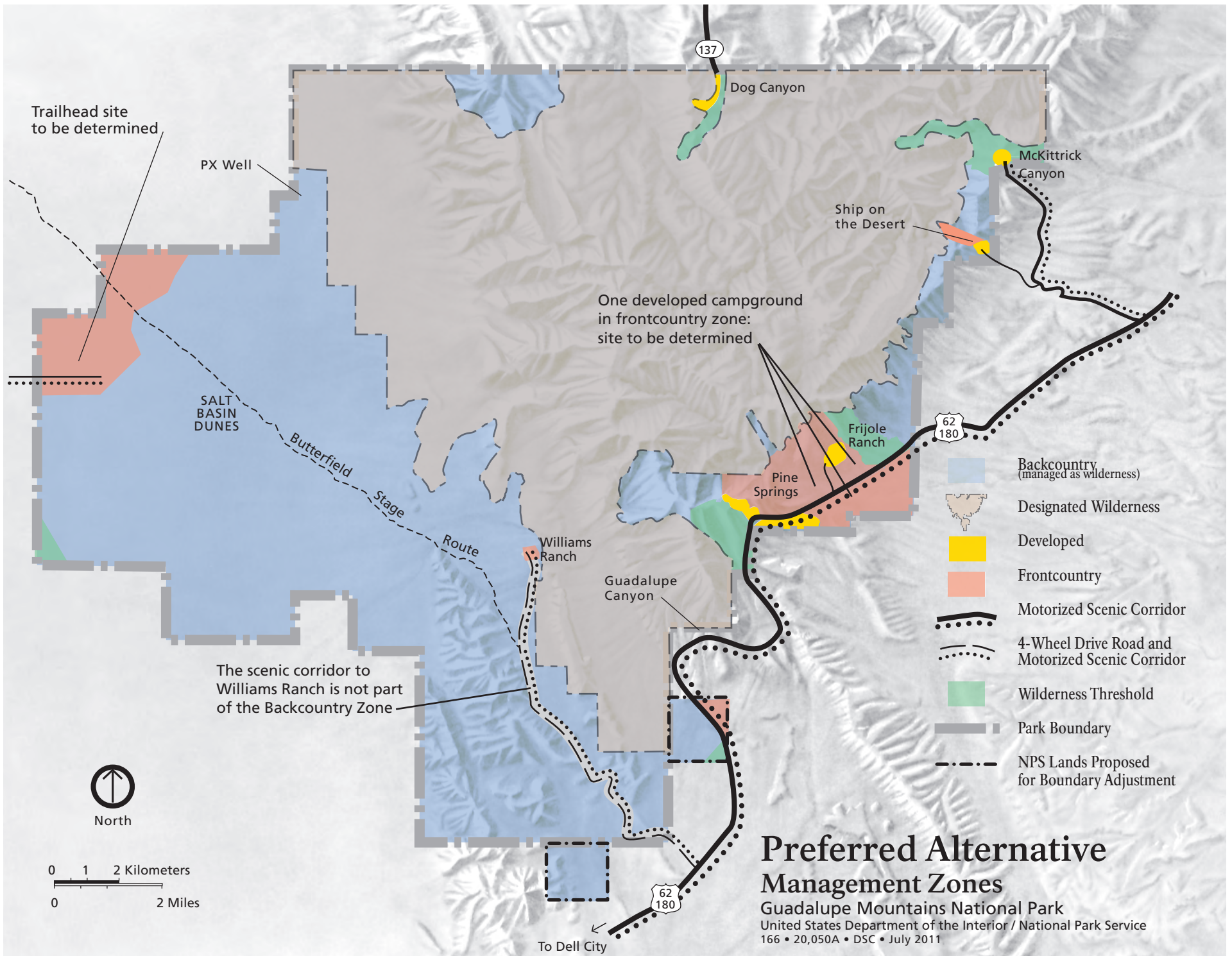
**Administration Facilities.** New administration facilities would be constructed within the park boundary close to the existing maintenance facility on the south side of U.S. Highway 62/180. As currently envisioned, the facilities would include

- headquarters offices and administrative space
- new, secure curatorial storage
- a parking lot

The additional space would allow staff to vacate the two three-bedroom houses that currently are used for office space. The houses would then be converted back to residential space for staff providing critical park functions. This would increase available park housing in the Pine Springs area by 15 percent.

New administration facilities would be constructed to Leadership in Energy and Environmental Design (LEED) standards. Site selection would include conducting surveys to ensure that important archeological resources or special-status species habitats are avoided. New facilities would not be constructed in a flashflood zone.

The utility infrastructure at Pine Springs would be upgraded to accommodate the expanded administrative facilities. This would include water, wastewater, telecommunications and electric power.



## **Frijole Ranch**

**Management Zoning.** Frijole Ranch would be in the developed zone. The area to the northeast would be zoned wilderness threshold. All other areas surrounding the developed zone would be assigned to the frontcountry zone. This unit may also have a developed zone for a campground relocated from the Pine Springs area.

**Facilities and Activities.** Frijole Ranch would continue to be a visitor destination for day-use opportunities, consistent with the settings and experiences prescribed in the developed and frontcountry zones. However, improvements at the site would enhance the cultural experience while providing a broader range of visitor experiences.

The cultural resource museum would be removed from the Frijole Ranch house and incorporated into the new cultural exhibits at the Pine Springs visitor center, where they would be available to larger numbers of visitors throughout regular hours, seven days a week. The exteriors of the historic structures, consisting of the Frijole Ranch barn, and other outbuildings, and the surrounding garden and orchard would be rehabilitated as an integrated cultural landscape that interprets ranching history. Updated outdoor exhibits would be provided so that even when volunteers were not present, visitors would have opportunities to understand the workings and values of an early 1900s west Texas ranch. Some targeted interpretive programs could be provided at this site.

The upgrades currently underway at Frijole Ranch for parking, picnicking, and restrooms were described in alternative A. These upgrades represent the existing condition for the preferred alternative. The public corral area would remain at its current location south of Frijole Ranch.

A small, low-country, hike-in campground below the eastern escarpment would be developed to provide a less challenging

backcountry experience with some wildland characteristics. The location for this small campground has not been determined, but candidates include sites along El Capitan Trail, between Frijole Ranch and Pine Springs, and off the Smith Springs Trail to the east or northeast. The concept would be to provide an opportunity for people who want to backpack but cannot climb to the top of the mountain, such as visitors with physical challenges and families with small children. However, the trail would not be wheelchair accessible.

Like the park's high country campgrounds, this campground's three to five sites would have tent pads constructed with landscape timbers. An associated area would be available for activities such as cooking and eating, but there would not be any picnic tables or other amenities. Campers would have to pack in their food and water and pack out their trash. It would be operated like all of the other backcountry campgrounds, which currently require a no-fee permit.

## **McKittrick Canyon**

**Management Zoning.** The McKittrick Canyon trailhead and contact station would be in the developed zone. The canyon from the trailhead to Pratt Cabin would be zoned as wilderness threshold. Areas uphill from Pratt Cabin and above the canyon sidewalls would be within the designated wilderness zone.

**Facilities and Activities.** McKittrick Canyon would continue to be a destination for day-use activities at the visitor contact station, trailhead area, and Pratt Cabin. Other areas would have few facilities, consistent with the settings and experiences prescribed in the wilderness threshold zone. The visitor contact station would be upgraded to bring exhibits up to date, better interpret the natural history of the canyon, and provide a stronger visitor understanding of geologic resources, wilderness and leave-no-trace ethics, the fragile canyon

ecosystem, and associated human impacts. This could include the use of information technology and audiovisual systems to maximize the visitor educational experience. Some targeted interpretive programs may be provided.

The McKittrick Nature Trail next to the visitor contact station would have limited improvements. This primarily would consist of additional and updated wayside exhibits. Management of the McKittrick Canyon Trail from the trailhead to Pratt Cabin would be much the same as in alternative A, with continued orientation and interpretation that emphasizes staying on the trail, resource protection, and employing leave no trace ethics, with stress on the absence of restroom facilities beyond the trailhead. Beyond the Pratt Cabin, the McKittrick Canyon Trail would be managed as a wilderness trail.

Pratt Cabin would continue to be preserved and used as an interpretive center, and water would not be available at this site. The goal would also be to not provide any sanitary facilities. The National Park Service would accomplish this by developing an aggressive education program to address sanitation.

### **Dog Canyon**

**Management Zoning.** The campground, trailhead, and contact station area at Dog Canyon would be in the developed zone. Upper Dog Canyon south of the developed zone to the switchbacks on Tejas Trail would be managed as wilderness threshold. All other areas would be within the designated wilderness zone.

**Facilities and Activities.** Most features at Dog Canyon would be the same as in alternative A. The primary change implemented with the preferred alternative would include the following.

The water storage system at Dog Canyon would be enlarged to a capacity of 30,000 gallons to meet visitor and operational needs. This would involve upgrades in both

the piping and storage components of the system.

### **Salt Basin Dunes**

**Management Zoning.** The area north of the existing road from the boundary to about a mile inside the park would be zoned frontcountry. The motorized scenic corridor zone would be applied along the road. The southeast corner where existing power line roads occur would be wilderness threshold. The remainder of the area, including the dunes, was found eligible for future consideration as wilderness and would be zoned backcountry.

**Facilities and Activities.** Staging areas are sites where groups such as hiking parties can gather in one location, park vehicles, organize equipment and people, and make other preparations prior to traveling into the park or hiking a trail. Staging and access for the Salt Basin Dunes area would be improved over time to provide enhanced use as a visitor destination for day-use. In the short-term, the current Salt Basin Dunes parking area on the western park boundary would be retained and slightly improved. This would include the addition of informational signs.

In the interim, the single-lane access road to this area would be maintained to provide access to low-clearance vehicles, but some visitors may still consider it challenging. It would probably include a scenic overlook with a wayside exhibit. The Salt Basin Dunes parking area may be relocated to provide better protection of resources and an enhanced visitor experience.

A detailed development concept plan with an environmental assessment would be prepared for the Salt Basin Dunes area, but as currently envisioned the trailhead parking lot would have a gravel surface and provide space for 10 vehicles. The new trailhead at this site would include about three picnic tables with shade structures and a vault toilet restroom. Visitors would access the dunes via a primitive trail that would be about a



mile long, depending on the selected location of the new trailhead relative to the dunes. Criteria to be used in siting all of these facilities include avoidance of archeological resources and special concern species, and accommodating concerns expressed by American Indians or others.

Wayside exhibits could be provided along the access road and at the new trailhead. Additional interpretive materials could be developed for use along the trail, but no interpretive signs or waysides would be installed in the dune area, which would be managed as wilderness.

In addition to visitor orientation, key points of the exhibits would include

- the ecology and geology of the red and white dunes
- the archeology and cultural history of the Salt Basin Dunes area
- wilderness values and the need to protect the area's wilderness resources

Surveys for natural and cultural resources would be conducted prior to the installation of any facilities to protect them by avoidance. Visitor use would be managed at the Salt Basin Dunes to ensure that wilderness values were maintained and damage to natural and cultural resources did not occur.

### **Williams Ranch**

**Management Zoning.** The area in the immediate vicinity of Williams Ranch would be zoned frontcountry. The motorized scenic corridor zone would be applied along the road from the park boundary to this historic site. The area to the west of Williams Ranch was found eligible for future consideration as wilderness and would be zoned backcountry. The area to the east of the ranch is within the designated wilderness zone.

**Facilities and Activities.** Access to Williams Ranch would be better maintained so that the ranch would be a visitor destination for day-use. The road would still be single lane

and would be restricted to high-clearance vehicles, but would be designed to better resist water damage and better accommodate travel in both directions. Use of the road would continue to be by permit only. A turnaround for vehicles would be developed at the house.

### **Other Visitor Facilities**

**Ship-on-the-Desert** would be assigned to the developed zone. The road from the park boundary to this site would be within the motorized scenic corridor zone.

The building and its cultural landscape would be rehabilitated to support research, education, and operation activities.

Possible formalized access to the **PX Well** trailhead site would be assigned to the frontcountry zone, and the current dirt road on park land would be within the motorized scenic corridor zone. Surrounding park lands were found eligible for future consideration as wilderness and would be zoned backcountry. There would continue to be no formalized access across private land likely within the timeframe of this plan.

A trail sign for the two trails that lead from the PX Well could be provided. Although some cairns might be placed to mark the trails' locations, both trails would be primitive, would not be maintained by the park, and would provide a true wilderness experience.

- Because the trail up to PX Flat is steep and is not suitable for horses, this trail probably would be designated for hikers only.
- The other trail is an old road that connected PX Well with Williams Ranch. The abandoned roadway can accommodate horse use, and the trail probably would be used by hikers and riders.

## NATURAL RESOURCES

Natural resource management would emphasize preservation and restoration of ecosystem function, particularly in areas negatively impacted by visitor use and access. Management of threatened or endangered species and other species of concern, and management of air quality would be the same as described for alternative A.

### Wilderness

As shown in the Preferred Alternative Management Zones map, the area that has been formally designated as wilderness by Congress would be assigned to the designated wilderness management zone. The areas that were found eligible for future consideration as wilderness in the wilderness eligibility assessment that is presented in appendix D would be assigned to the backcountry zone.

New lands acquired on the west side have been assessed for wilderness eligibility. Those areas formerly excluded from wilderness designation but with wilderness attributes, including the northeastern slopes of Guadalupe Peak (including trail), Bear Canyon, the Patterson Hills, and western bajadas, would be managed consistent with the backcountry zone and have been recommended for inclusion in the wilderness study for formal wilderness designation.

Wilderness management would be expanded to a maximum extent consistent with the settings and experiences prescribed in the backcountry zone.

The expanded exhibits at the Pine Springs visitor center would provide increased education on the ecological and social importance of wilderness. Upgraded exhibits at this site, at trailheads, in park publications, and on the Internet would emphasize wilderness ethics and “leave no trace” standards for all wilderness activities.

The tent pads would be maintained at the 10 designated backcountry campsites. Additionally, primitive sanitary facilities could be provided if needed to protect resources.

### Geological and Paleontological Resources

Geological and paleontological resources would be managed as described in alternative A.

### Plants and Wildlife

The goal of all management actions for plants and wildlife would be identical to that described for alternative A.

**Management of Human-Disturbed Ecosystems.** These areas would be managed much as described in alternative A. However, some active manipulation would be implemented to reduce impacts and hasten restoration. In particular, the recovery of previously grazed areas would be augmented by aggressive control of exotic plants.

**Management of Exotic Species.** The management of exotic plant and animal species that threaten park resources or public health would be the same as alternative A. Also like alternative A, horse use that was limited to day-use on designated trails would continue to be allowed within the same area. Changes from alternative A would include the following:

- This alternative would have the broader goal of eradicating target species of exotic plants throughout the park.
- It would use more strict control measures to protect native plant and animal species and communities from impacts from exotic species.
- Within the designated wilderness and backcountry zones, and particularly along trails, aggressive management action would be used to prevent or minimize the spread of exotics.
- Conditions for native plant revegetation would be enhanced by creating an active

planting program using locally collected seed.

**Management of Wetland and Aquatic Environments.** All wetland and aquatic environments would be protected as natural ecosystems. Fragile wetland soils and vegetation of natural springs would be protected by not providing any new access and development to wetlands. Management of wetlands and aquatic environments that are cultural landscape components would be assessed for significance and appropriate management.

**Management of Research Natural Areas.** Management would continue as described for alternative A. However, additional research natural areas could be added to the system if appropriate and consistent with this program.

### **Water Quality and Quantity**

Management of water resources would be similar to that described in alternative A, but the National Park Service would be more aggressive in protecting water quality and quantity. In particular, this would include designing and implementing a groundwater monitoring program on the west side of the park.

## **CULTURAL RESOURCES**

Cultural resource management would emphasize preservation and rehabilitation of significant resources. Management of ethnographic resources would be the same as described for alternative A.

### **Archeological Resources**

Management of archeological resources would be the same as alternative A except that archeological sites would be protected and stabilized.

### **Historic Structures and Landscapes**

Historic structures and landscapes listed in, or eligible for listing in, the National Register of Historic Places would be preserved while

providing appropriate visitor access. Remnants of historic ranching activities in the backcountry zone would remain as discovery sites.

The management of historic structures and landscapes associated with visitor facilities throughout the park was described previously under the heading “Facilities and Associated Visitor Activities.” A summary of the key changes that would occur under the preferred alternative includes the following.

- The Frijole Ranch cultural landscape would be rehabilitated and interpreted as a historic landscape consistent with the developed zone.
- The Williams Ranch landscape would be rehabilitated with no interior visitor access to the house.
- Ship-on-the-Desert would be rehabilitated for adaptive use.

The management of sites that were not addressed as part of visitor facilities would be as follows.

- The Cox Cabin and Bowl Cabins would be studied for national register eligibility. They would remain discovery sites and would be allowed to deteriorate with any safety hazards mitigated.
- Other discovery sites that became a safety concern would be assessed and documented for the national register (if appropriate) and removed or the hazard would be mitigated.
- Areas subject to any remnant removal would be restored to natural conditions, when possible.

### **Collections**

The majority of the museum collections would be stored off-site in approved collection repositories consistent with the servicewide Museum Collections Facilities Strategy. A representative sample of the collection would remain within the park for research, training, and interpretive purposes. Appropriate study and storage space would be incorporated into the new consolidated

headquarters and administrative building. The design of these spaces would be consistent with applicable preservation and security standards.

## **VISITOR USE AND UNDERSTANDING**

Many elements of visitor use and understanding already have been described in other elements of the preferred alternative, particularly including “Facilities and Associated Visitor Activities.” To avoid repetition, this section focuses on the broad nature of visitor use and understanding that would be associated with this alternative, plus features that contribute to visitor use and understanding that were not previously addressed.

Under the preferred alternative, park visitors would learn about and experience the park’s human history through exhibits, audio-visual media, and exposure to the park’s cultural resources. Geological and fossil formations, as well as the park’s native plants and animals, would contribute to an increased understanding of the park’s significance.

Visitors to Guadalupe Mountains would be given opportunities to have a true wilderness experience at a self-sufficiency level. Isolated and challenging wilderness opportunities would include the solitude, tranquility, and beauty of the rugged wilderness.

### **Visitor Experience**

The Pine Springs visitor center would provide an improved understanding of the park’s geological and natural history. Its enhanced exhibits also would include both natural and cultural/historical themes for a more comprehensive presentation of resources in the park.

The rehabilitated components of the cultural landscape would provide visitors with opportunities to understand the workings and values of a west Texas ranch in the early 1900s. Visitors also would come into contact

with abandoned farm and ranch ruins throughout the park. Through these experiences they would have the opportunity to better understand the nature of ranching in a severe environment.

A wider diversity of visitors would be accommodated in new camping opportunities in the park. In concert with increased interpretation, this would enable a broader segment of the population to gain an increased understanding of the value of clear night skies.

An understanding of wilderness values and leave-no-trace standards would be available to all visitors seeking a backcountry experience either through day hikes into the park’s backcountry or through a backcountry permit allowing overnight use. An understanding of wilderness values and ethics would be emphasized in all interpretive activities.

The trail and backcountry camping system would not change from alternative A. Through direct experience, visitors would be able to gain a first-hand understanding of wilderness values.

### **Visitor Education, Interpretation, and Orientation**

Education, interpretation, and orientation opportunities would be provided in accessible, enhanced visitor facilities and targeted interpretive programs and activities. Facilities and exhibits would be improved at the visitor center, Frijole Ranch, and the contact station in McKittrick Canyon. Space for seminars and educational programs would be available at the visitor center. Ship-on-the-Desert would support research, educational, and operational activities.

Additional and improved wayside interpretive exhibits would be more widely dispersed parkwide. Contact stations, trailheads, and scenic corridor stops would emphasize the ecological importance of wilderness and the significance of the park. Visitor orientation and wayside exhibits

would be provided at the Salt Basin Dunes to interpret the ecology, geology, and cultural history of the dunes.

### **Interpretive and Educational Outreach Programs and Media**

In addition to the expanded programs and media at visitor facilities, an expanded educational outreach program would target a wider range of audiences. These would include people who have not traditionally used the park. Audiovisual technology would present park themes, information, and values.

- The Pine Springs visitor center and contact station at McKittrick Canyon would have updated exhibits and information technology to maximize the visitor educational experience.
- Computer-based audiovisual media would provide enhanced opportunities for those who do not actually explore the park.
- Video technology would simulate trips in park wilderness areas for those unable to access it directly.
- Interactive media, the park's Internet site, and other technology would be enhanced to more effectively interpret park resources and values.
- Outreach and educational programs would be planned and presented onsite and offsite with emphasis on curriculum-based materials.
- Outreach to local communities and educational groups would be expanded, including El Paso and Juarez.

### **Visitor Access, Circulation, and Parking**

**Visitor Access.** The preferred alternative would expand overnight access to the park through the addition of new or expanded camping facilities.

- Expanded opportunities for overnight stays for all levels of camping would be available in the new, larger campground

that would be located in the vicinity of Pine Springs or Frijole Ranch.

- A small, low-country, hike-in campground below the eastern escarpment about 2 miles from the Frijole Ranch parking lot would provide a backcountry experience without the need for a strenuous, uphill hike.

**Circulation.** Internal circulation would be improved by as follows:

- The single-lane road from the park's west boundary to an area about a mile west of the Salt Basin Dunes would be improved to provide access by low-clearance vehicles.
- Access to Williams Ranch would be improved by upgrading the single lane road through engineered measures to reduce water damage and better accommodate travel in both directions through the use of pulloffs. This road would continue to be limited to high-clearance vehicles.

**Parking.** Additional parking would be available at several sites throughout the park.

- Additional parking would be available in the trailhead parking lot at Pine Springs because recreational vehicle campers would be moved to the new campground.
- Additional parking would be available in the Pine Springs visitor center parking lot because hikers and backpackers would be able to use the trailhead parking lot. Additionally, most use by NPS staff would move to the new administrative facility south of U.S. Highway 62/180.
- The Salt Basin Dunes trailhead parking lot a mile east of the park boundary would be improved with a gravel surface.
- The vehicular circulation at Williams Ranch would be improved and eliminate the need to expand the size of the parking lot.

### Hiking Trails, Trailheads, and Horse Use

**Hiking Trails.** Two primitive trails that start at PX Well would increase hiking opportunities in the northwest park. In addition, the National Park Service may add to the park's trail inventory by mapping hiking trails along abandoned trails and road traces on the park's west side that date from the area's ranching period. These would be managed as primitive trails in a wilderness setting, and improvements would be limited to cairns to mark trail routes in difficult-to-follow areas and, possibly, signs at junctions with other trails.

**Trailheads.** A new trailhead would be constructed about a mile west of the Salt Basin Dunes. The existing trailhead would be improved at Frijole Ranch. There would continue to be no formalized access across private land between Salt Basin Dunes and the PX Well as well as on the road to Guadalupe Pass likely within the timeframe of this plan.

**Horse use.** The public corrals would remain at Frijole Ranch and Dog Canyon. Within the designated wilderness and backcountry zones, horse use would continue to be limited to day-use only, with no stock allowed in these zones overnight.

### PARK OPERATIONS

Many elements of park operations would remain the same as in alternative A. Most of the changes that would occur already have been described in other elements of the preferred alternative, particularly including "Facilities and Associated Visitor Activities." They include the following:

- A new administrative facility would be constructed south of U.S. Highway 62/180. Most administrative offices would be moved from the visitor center building to this new facility.
- Sanitation facilities in wilderness threshold, backcountry, and designated wilderness zones would be provided or

improved only in cases of demonstrated need that could not be mitigated by improved education of visitors.

- Ship-on-the-Desert would be rehabilitated to support research, educational, and operational activities.
- Operations improvements at Dog Canyon would include an enlarged water storage system.

Pine Top patrol cabin could be removed in the future.

A commercial services plan would be prepared to evaluate the potential for providing park services that are necessary and appropriate through concessioners. Opportunities could include, but would not be limited to, operation of the new campground in the vicinity of Pine Springs or Frijole Ranch, and commercial horse operations at Frijole Ranch and/or Dog Canyon. However, they would not include facilities such as a gasoline station or a store.

### BOUNDARY ADJUSTMENT

The preferred alternative would include a boundary adjustment like that described in alternative A.

### MANAGEMENT PRINCIPLES THAT ADDRESS CLIMATE CHANGE

Climate change could adversely affect the future resource conditions of the park. As global and regional climates continue to change, a management approach that enhances the protection and resiliency of climate-sensitive resources is becoming increasingly important. This alternative would include the following strategy, which adapts to the growing understanding of climate change influences and the effectiveness of management to contend with them.

Climate change science is a rapidly advancing field. Although new information is continually being collected and analyzed, the full extent of climate change impacts to

resource conditions is not known. As such, park managers and policy makers have not determined the most effective responses for minimizing impacts and adapting to change. This proposed management strategy does not provide definitive solutions; rather it provides science-based management principles that park managers will consider when implementing the broader management direction of the preferred alternative.

Many of the principles listed below for Guadalupe Mountains National Park are adapted from *Some Guidelines for Helping Natural Resources Adapt to Climate Change* (International Human Dimensions Programme 2008). Elaboration and modification of these principles to meet park-specific conditions will occur as implementation of the general management plan proceeds.

- Identify key resources and processes that are at risk from climate change.
- Establish baseline resource conditions, identify thresholds, and monitor for change.
- Assess, plan, and manage resources at multiple scales, such as site-specific and parkwide.
- Use adaptive management to minimize risks to park resources.
- Form partnerships with other resource management entities to maintain regional habitat connectivity and refugia that allow species dependent on park resources to better adapt to changing conditions.
- Use best management practices to reduce human-caused stresses, such as those resulting from park infrastructure and visitor-related disturbances, which hinder the ability of species or ecosystems to withstand climatic events.
- Restore key ecosystem features and processes to increase their resiliency to climate change.
- Reduce or mitigate greenhouse gas emissions associated with park

operations and visitor use (that is, the park's carbon footprint).

## COSTS

The estimated costs to fully implement the preferred alternative were shown in table 4. The costs in the table provide a relative sense of the resources necessary to implement this alternative. The cost estimate has been rounded to the nearest thousand dollars. These estimates should not be used for budgetary purposes.

The total one-time cost to implement the preferred alternative would be \$9,620,000. In addition to the costs described in alternative A, the National Park Service would develop a new administrative facility, provide a new campground in the vicinity of Pine Springs or Frijole Ranch, and improve access to the Salt Basin Dunes. The estimated cost for one-time construction would be \$6,675,000.

This alternative would include resource management actions, including revegetation of disturbed areas and areas where exotic species were removed. Interpretive and orientation information improvements would improve the visitor experience in the park. The one-time, non-facility costs would be \$2,945,000, which would include \$2,475,000 for resource management and \$470,000 for visitor experience and orientation.

Annual operating costs for the park would be covered within the estimated 2011 base budget of \$2,901,000.

The total number of full-time employees would be 34. With the increased operational flexibility, the National Park Service anticipates being able to hire temporary and seasonal staff to complete some resource management actions included in this alternative, such as the landscape rehabilitation work.

The total amount of deferred maintenance in the park could nominally decrease as a result of this alternative. The housing units

currently being used for administrative office space would be converted back into housing once the headquarters building was completed. Rehabilitating these structures so that they could again be used as housing would address any deferred maintenance on these structures. The contribution of the housing structures to the total deferred maintenance is small, and because the long-term estimates for deferred maintenance are

imprecise, no change is shown in table 4 in the deferred maintenance needs at the park. However, because the preferred alternative should provide the National Park Service with greater operational flexibility, some deferred maintenance actions could be addressed in a timelier manner, and the National Park Service could better implement priority actions that could be funded from the park budget.



## ALTERNATIVE B

### CONCEPT

This alternative would place a major emphasis on promoting wilderness values and restoring natural ecosystem processes. There would be greater opportunities than currently exist for visitors to experience untrammeled, challenging conditions. Specifically,

- Large areas of the park would be zoned as designated wilderness and backcountry (assessed as eligible for wilderness). In these areas, visitors would experience a wilderness situation.
- Visitors who did not access the backcountry zone areas or designated wilderness directly could gain an understanding of wilderness values indirectly through enhanced interpretive presentations in visitor facilities.
- Visitors would have greater day-use opportunities with improved and more concentrated facilities, greater accessibility in developed areas, and enhanced exhibits.
- Visitor use levels would be actively managed in the designated wilderness and backcountry zones to reduce resource impacts and support natural ecosystem processes.
- Key cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated, sometimes limiting visitor access.

As shown in the Alternative B Management Zones map, this alternative would maximize the use of the wilderness threshold zone outside the designated wilderness and backcountry zones. The frontcountry zone would be limited to the use area between and adjacent to Pine Springs and Frijole Ranch, very small staging areas for the Salt

Basin Dunes and Williams Ranch, and the old Signal Peak housing area.

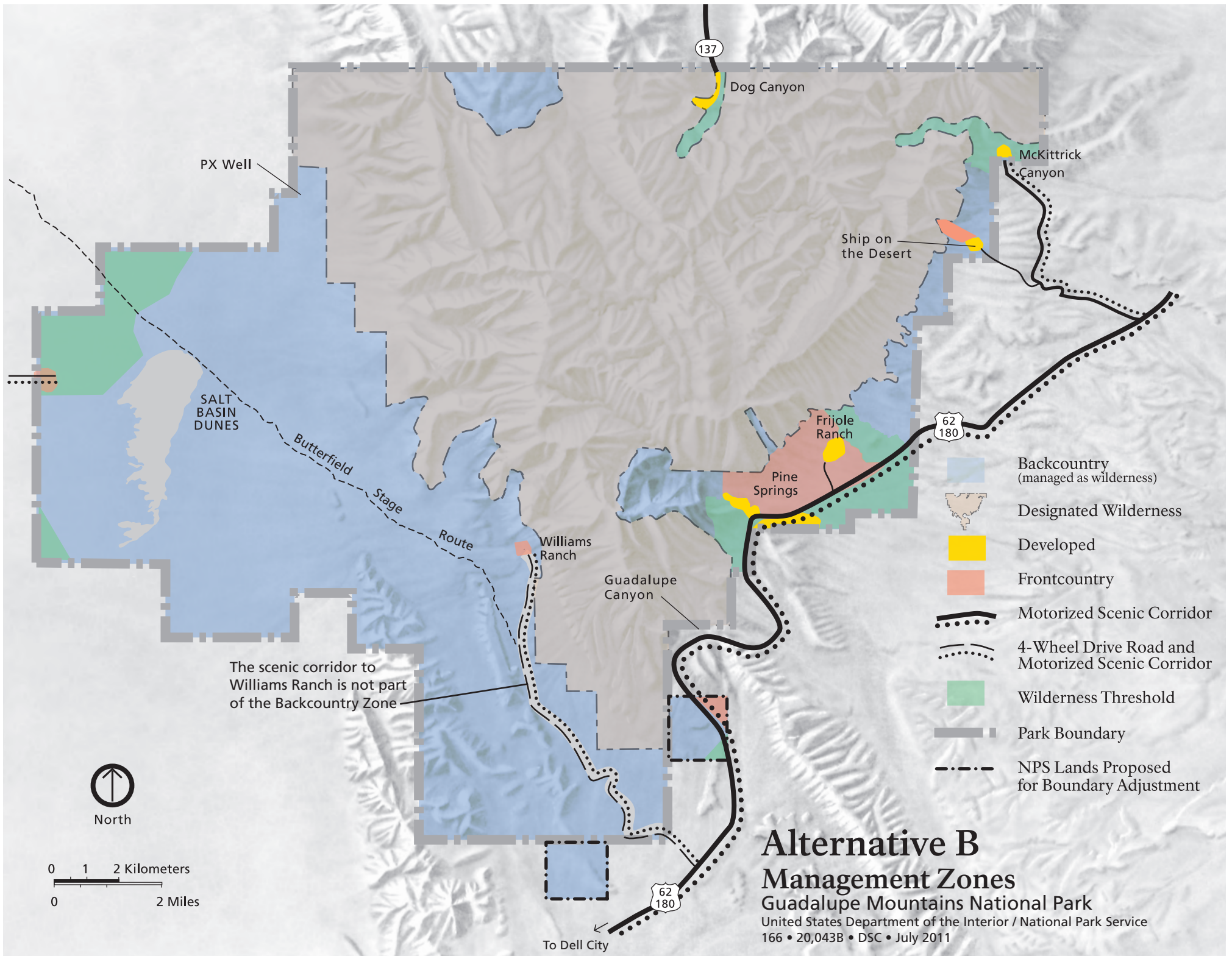
Developed zones would be bordered more frequently by wilderness threshold zones than frontcountry zones, providing little transition from developed to natural settings. New access points might be established, but would be primitive with few or no facilities. As described in the preferred alternative, the park's trail inventory could be expanded by mapping old ranch trails and road traces, but these would not be improved or maintained and would provide a primitive hiking experience.

### FACILITIES AND ASSOCIATED VISITOR ACTIVITIES

#### Pine Springs

**Management Zoning.** The management zones that would be applied to the Pine Springs area are shown in the Alternative B Management Zones map. Zoning would be the same as the preferred alternative, except that the area south of U.S. Highway 62/180 outside the developed zone would be in the wilderness threshold zone (rather than the frontcountry zone).

**Visitor Center Area.** The visitor center and associated parking lot and picnic area would continue to be a primary visitor destination point for day-use and for visitors who make a single, park-related stop as they travel through the region on U.S. Highway 62/180. The visitor center building also would continue to be used for administrative offices. The displays in the visitor center would be improved to provide an increased emphasis on wilderness, including the ecological importance of wilderness and the ecosystem relationships within the park.



Opportunities to understand wilderness values and leave-no-trace standards would be available to all visitors seeking a backcountry experience either through day hikes into the park's backcountry or through a backcountry permit allowing overnight use. Wilderness values and ethics would be emphasized in all interpretive activities.

**The Pinery Area.** Facilities and management of the Butterfield Stage Station Ruins would not change from the no action alternative.

**Pine Springs Trailhead Area.** All overnight camping would be removed from the trailhead area at Pine Springs. Recreational vehicle owners and tent campers would have to find camping at sites outside the park, such as at commercial operations on private land or on U.S. Forest Service or Bureau of Land Management lands to the north in New Mexico.

The closed tent camping area would be restored to a natural condition. The parking lot would be available only for day-use, such as by picnickers and day hikers, and for overnight parking of the empty vehicles belonging to hikers who were making multi-day hikes to the interior of the park.

The elimination of camping would make more trailhead parking available for wilderness users. The picnic tables would be more available to day-users, and picnicking may become a more common activity in the trailhead area.

**Administrative Facilities.** No new offices or operational facilities would be built. Existing or additional operational needs would be addressed by adapting existing structures in the housing area south of U.S. Highway 62/180.

### **Frijole Ranch**

**Management Zoning.** Management zoning would be similar to the preferred alternative, except that the area south of U.S. Highway 62/180 would be zoned as wilderness threshold rather than frontcountry

**Facilities and Activities.** Frijole Ranch would continue to be a visitor destination for day-use opportunities, consistent with the settings and experiences prescribed for the developed and frontcountry zones. The cultural landscape restoration that was described in alternative A would be implemented, and the exteriors of the buildings would be preserved for interpretation of this national register site. However, the emphasis would be on maintaining facilities, consistent with this alternative's focus on enhanced resource restoration.

The Frijole Ranch house would continue to house the cultural museum. The facilities at Frijole Ranch would continue to be staffed primarily by volunteers.

The parking area, picnic area, hard-surface path, trail signs, and vault toilet that currently are being constructed at Frijole Ranch would not change from alternative A. However, alternative B would remove the public corral and NPS pack animal operations would be relocated to a leased site outside the park. Both sites would be restored to a natural condition.

### **McKittrick Canyon**

**Management Zoning.** Zoning in the McKittrick Canyon area would be the same as that described for the preferred alternative.

**Facilities and Activities.** McKittrick Canyon would continue to be a destination for day-use activities. With the following exceptions, facilities and activities in this area would be the same as in the preferred alternative.

- The upgraded exhibits at the visitor contact station would provide orientation to self-discovery opportunities and would place added emphasis on wilderness and leave-no-trace use of the land.
- Restrooms would not be provided in the Pratt Cabin area.

### **Dog Canyon**

**Management Zoning.** Zoning in the Dog Canyon area would be the same as that described for the preferred alternative.

**Facilities and Activities.** Many features at Dog Canyon would remain the same as in alternative A. Changes implemented with alternative B would include the following.

Recreational vehicle camping would be removed. The existing tent camping and hiking facilities would be maintained.

The water storage system at Dog Canyon would be enlarged to meet visitor and operational needs. Changes would be the same as those described for the preferred alternative.

The public horse corral would be removed. The NPS' pack horse operation at Dog Canyon would be relocated to a leased facility outside the park. These sites and the former recreational vehicle camping area would be restored to a natural condition.

### **Salt Basin Dunes**

**Management Zoning.** A small area just inside the park boundary would be zoned frontcountry. Beyond this zone to a distance of about a mile from the boundary, the wilderness threshold zone would be applied. The remainder of the area, including the dunes, were found eligible for future consideration as wilderness and would be zoned backcountry.

**Facilities and Activities.** Staging and access for the Salt Basin Dunes area would be similar to that described for the preferred alternative. However, the parking lot and trailhead would be just inside the park boundary, and visitors would hike a 2-mile-long primitive trail to access the dunes. The former small parking lot about a mile from the boundary would be removed and the site would be restored to a natural condition.

### **Williams Ranch**

**Management Zoning.** Management zoning would be the same as described for the preferred alternative.

**Facilities and Activities.** The condition and management of the road and parking lot associated with Williams Ranch would be the same as alternative A. In this alternative, the cultural landscape would be stabilized. Otherwise, facilities and activities would be the same as the preferred alternative.

### **Other Visitor Facilities**

**Ship-on-the-Desert** would be assigned to the developed zone and the road into the site would be in the motorized scenic corridor zone. The building and cultural landscape would be preserved, but the site would not be adaptively used for any purposes.

**PX Well** is within an area that has been found eligible for future consideration as wilderness, and would be zoned backcountry. It would be maintained as a discovery site.

At the **Guadalupe Pass trailhead area**, the National Park Service would formalize an access agreement with landowners as described in the preferred alternative.

## **NATURAL RESOURCES**

Natural resource management would emphasize restoration and preservation of impacted landscapes. Management of threatened or endangered species and other species of concern, and management of air quality would be the same as described for alternative A.

### **Wilderness**

Alternative B would have less extensive development of trailheads that provide access to backcountry and designated wilderness zones. Otherwise, its management of wilderness would be identical to the preferred alternative.

## **Geological and Paleontological Resources**

Geological and paleontological resources would be managed in a manner similar to that described in alternative A. A permit system would be used to provide access to specific stratotype and fossil locations and would increase the protection of these resources.

## **Plants and Wildlife**

The goal of all management actions for plants and wildlife would be identical to that described for alternative A.

**Management of Human-Disturbed Ecosystems.** These areas would be managed as described in the preferred alternative. In addition, vegetation would be restored at sites where facilities were removed. These would include, but may not be limited to, the tent campground at Pine Springs, the public corrals and NPS pack animal operations, and the parking lot near the Salt Basin Dunes.

**Management of Exotic Species.** The management of exotic plant and animal species, including aoudads, which threatened park resources or public health would be the same as alternative A. Changes from alternative A would include the following.

- This alternative would have the broader goal of eradicating all species of exotic plants throughout the park.
- It would use more strict control measures to protect plant and animal species and communities from impacts from exotic species.
- Horse use would be prohibited within the designated wilderness and backcountry zones to prevent the spread of exotic species.
- Conditions for native plant revegetation would be enhanced by creating an active planting program using locally collected seed.

**Management of Wetland and Aquatic Environments.** With the exception of

Manzanita Spring, all wetland and aquatic environments would be protected as natural ecosystems. The protection of fragile wetland soils and vegetation of Smith Spring would be improved by limiting access.

**Management of Research Natural Areas.** Management would continue as described for alternative A. However, new lands could be identified and designated as research natural areas where no human-caused impacts would occur. Specifically, this alternative would designate research natural areas in representative ecosystems, including the Chihuahuan Desert and the Salt Basin Dunes.

## **Water Quality and Quantity**

The management of water resources for this alternative would be the same as those described for the preferred alternative.

## **CULTURAL RESOURCES**

Cultural resource management would be directed toward preserving and stabilizing nationally significant resources only. Management of ethnographic resources would be the same as described for alternative A.

## **Archeological Resources**

Management of archeological resources would be the same as alternative A except that archeological sites would be protected and preserved.

## **Historic Structures and Landscapes**

Historic structures and landscapes listed in or eligible for listing in the National Register of Historic Places would be preserved while providing minimum access required for visitor understanding. Remnants of historic ranching activities in the backcountry zone would be removed after they were determined to be ineligible for listing in the national register.

The management of historic structures and landscapes associated with visitor facilities

throughout the park was described previously under the heading “Facilities and Associated Visitor Activities.” A summary of the key changes that would occur under alternative B includes the following.

- The Frijole Ranch cultural landscape would be rehabilitated and interpreted as a period ranch consistent with the developed zone.
- Williams Ranch cultural landscape would be stabilized with no interior visitor access, consistent with the frontcountry zone.
- Ship-on-the-Desert and its cultural landscape would be preserved with no adaptive use.

Management of the Cox Cabin, and Bowl Cabin would be the same as in the preferred alternative. The preferred approach for remnants of historic ranching activities in the backcountry zone would be removal after they were determined to not be eligible for listing in the national register. Natural conditions would be restored at removal sites.

### **Collections**

The majority of the museum collections would be stored off-site in approved collection repositories consistent with the servicewide Museum Collections Facilities Strategy. A representative sample of the collection would remain within the park for research, training, and interpretive purposes. Appropriate study and storage space would be provided within existing facilities in the park that have been adapted for this use.

### **VISITOR USE AND UNDERSTANDING**

Many elements of visitor use and understanding already have been described in other elements of alternative B, particularly including “Facilities and Associated Visitor Activities.” To avoid repetition, this section focuses on the broad nature of visitor use and understanding that

would be associated with this alternative, plus features that contribute to visitor use and understanding that were not covered previously.

Visitor understanding would be focused on promoting wilderness values and restoring natural ecosystem processes. Improvements in interpretation would be less extensive than in the preferred alternative.

### **Visitor Experience**

The Pine Springs visitor center would provide an improved understanding of the park’s geological and natural history, wilderness, and leave-no-trace use of the land.

Frijole Ranch would continue to house the cultural museum.

Because the campground at Pine Springs would be removed, visitors would not have the opportunity to camp along the eastern alluvial uplands and would not have the easily accessible opportunity to understand the values and threats to the night sky resource.

Opportunities to understand wilderness values and leave-no-trace standards would be available to all visitors seeking a backcountry experience either through day hikes into the park’s backcountry or through a backcountry permit allowing overnight use. Wilderness values and ethics would be emphasized in all interpretive activities.

The trail and backcountry camping system would not change from alternative A. Through direct experience, visitors would be able to gain a first-hand understanding of wilderness values.

### **Visitor Education, Interpretation, and Orientation**

Education, interpretation, and orientation opportunities would be concentrated in accessible, enhanced visitor facilities. Facilities and exhibits would be improved at the visitor center, Frijole Ranch, Pratt Cabin, and the contact station at McKittrick

Canyon. Consistent with this alternative's theme of enhanced resource restoration, most visitor exhibits would highlight the park's natural and geologic resources, the fragile canyon ecosystem, the ecological importance of wilderness, and self-discovery opportunities. The exception would be at Frijole Ranch, which would focus on cultural and historical themes.

In other locations, the focus would be on self-discovery with visitors seeking a wilderness experience.

### **Interpretive and Educational Outreach Programs and Media**

Programs and media would be enhanced at the visitor center and contact stations using audiovisual technology to present park themes, information, and values.

- The visitor contact station at McKittrick Canyon would have updated exhibits, information technology, and audiovisual systems to maximize the visitor educational experience and minimize staffing requirements.
- Computer based audiovisual media would provide enhanced opportunities for those who do not actually explore the park.
- Video technology would simulate trips in park's wilderness areas for those unable to access it directly.

### **Visitor Access, Circulation, and Parking**

**Visitor Access.** Alternative B would decrease overnight access to the park through the removal of existing camping facilities.

- All overnight camping would be removed from the trailhead area at Pine Springs, which would become a day-use-only area. Recreational vehicle owners and tent campers would have to find camping at sites outside the park
- Recreational vehicle camping would be removed at Dog Canyon, which would become a tent camping only area.

**Circulation.** Alternative B would remove the 1-mile-long road from the park's west boundary to the Salt Basin Dunes parking area.

**Parking.** A new parking lot for the new Salt Basin Dunes trailhead would be constructed just inside the park boundary. This parking lot would have a gravel surface and space for 10 vehicles. At the Pine Springs trailhead, additional parking for day-use and overnight backcountry hikers would be available because all camping would be removed from this site.

### **Hiking Trails, Trailheads, and Horse Use**

**Hiking Trails.** Existing trails would be managed as described in alternative A. As described in the preferred alternative, the National Park Service may add to the park's trail inventory by mapping hiking trails along abandoned trails and road traces on the park's west side that date from the area's ranching period. These all would be managed as primitive trails in a wilderness setting, and improvements would be limited to cairns to mark trail routes in difficult-to-follow areas and, possibly, signs at junctions with other trails.

**Trailheads.** Alternative B would include a new trailhead just inside the park boundary about 2 miles west of the Salt Basin Dunes.

**Horse Use.** Alternative B would eliminate all visitor horse use in the park. The public corrals at Frijole Ranch and Dog Canyon would be removed.

### **PARK OPERATIONS**

Many elements of park operations would remain the same as in alternative A. Most of the changes that would occur already have been described in other elements of alternative B, particularly including "Facilities and Associated Visitor Activities." They include the following:



- Existing facilities in developed and frontcountry zones would be used to meet administrative needs.
- Sanitation facilities in wilderness threshold and backcountry zones could be provided in cases of demonstrated need that could not be mitigated by improved education of visitors.
- All NPS pack horse operations would be moved to leased sites outside the park.
- The water storage system at Dog Canyon would be enlarged.

In addition to features described earlier for this alternative, the Pine Top patrol cabin would be removed and area would be restored consistent with the backcountry zone.

### **BOUNDARY ADJUSTMENT**

Alternative B would include a boundary adjustment like that described in alternative A.

### **COSTS**

The estimated costs to fully implement alternative B were shown in table 4. The costs in the table provide a relative sense of the resources necessary to implement this alternative. The cost estimate has been rounded to the nearest thousand dollars. These estimates should not be used for budgetary purposes.

The total one-time cost to implement alternative B would be \$5,786,000. The one-time construction costs primarily would address improvements to historic structures,

trailheads, and some contract stations to support visitor opportunities to experience wilderness while providing an improved orientation to the park. The estimated one-time construction costs would be \$3,111,000.

Alternative B would include extensive work on park resources, including restoration of the areas currently occupied by campgrounds and horse corrals, and the removal of exotic species. The total estimated one-time non-facility costs would be \$2,675,000, which would include \$2,475,000 for resource management and \$200,000 for improvements to visitor orientation.

Annual operating costs for the park would be covered with the estimated 2011 base budget of \$2,901,000.

The total number of full time employees would be 34. The National Park Service anticipates being able to hire temporary and seasonal staff to complete some resource management actions included in this alternative, such as the landscape rehabilitation work.

The total amount of deferred maintenance in the park would be unlikely to change because of this alternative. The housing units would continue to be used for administrative office space, and the deferred maintenance on these structures could remain. The increased operational flexibility in this alternative could enable the National Park Service to address some deferred maintenance actions in a timelier manner, and implement some priority actions that could be funded from the park budget.



## ALTERNATIVE C

### CONCEPT

This alternative, which is illustrated in the Alternative C Management Zones map, would expand opportunities for visitors to enjoy easier access to a wider range of park settings than currently exist. New park access and facility improvements would be more dispersed and would provide opportunities for a less-challenging wilderness experience that would accommodate more diverse visitor populations. Promoting wilderness values also would be emphasized.

Easier access to multiple settings would provide visitors with a wider range of overnight and multi-day destination activities. Wilderness experiences would still be available in the park's interior, but most areas around the existing developed sites would be zoned as frontcountry rather than the more primitive wilderness threshold. The frontcountry zone would include

- most of the area near the developed zones at Pine Springs, Frijole Ranch, Dog Canyon, and McKittrick Canyon to Pratt Cabin
- the area around the Salt Basin Dunes trailhead facilities
- the old Signal Peak housing area
- the Williams Ranch, Guadalupe Canyon, and PX Well areas

These frontcountry zones would provide some transition from developed to natural settings while improving access to the backcountry and designated wilderness zones. Additional trails and developed staging areas would enhance access. The new trails would be designed to accommodate larger numbers of visitors, sometimes including those with impaired mobility.

Increases in dispersed visitor use outside development centers would require more

aggressive resource impact mitigation to maintain natural ecosystem processes. Cultural resources, including historic structures, would be stabilized and/or preserved or rehabilitated, with the goal of protecting them from impacts while accommodating visitor use.

### FACILITIES AND ASSOCIATED VISITOR ACTIVITIES

#### Pine Springs

**Management Zoning.** The management zones that would be applied to the Pine Springs area are shown in the Alternative C Management Zones map. Zoning in the Pine Springs vicinity would be the same as the preferred alternative.

**Visitor Center Area.** The area outside the visitor center would be managed much as described for the preferred alternative, with continued use of the tent campground and picnic area. The interior of the Pine Springs visitor center would be remodeled to accommodate new and relocated cultural resource exhibits and space for educational programs, classrooms, and group events. The existing exhibits would continue to provide a basic understanding of the park's geological and natural history. Exhibits also would stress wilderness values and leave-no-trace standards. Expanded orientation would familiarize visitors with the enhanced facilities, increased interpretive opportunities, and expanded activities throughout the park.

**The Pinery Area.** The interpretive walk at the Pinery would be improved by

- upgrading the trail surface
- improving interpretation by delineating the original floor plan
- adding seating and a shade structure

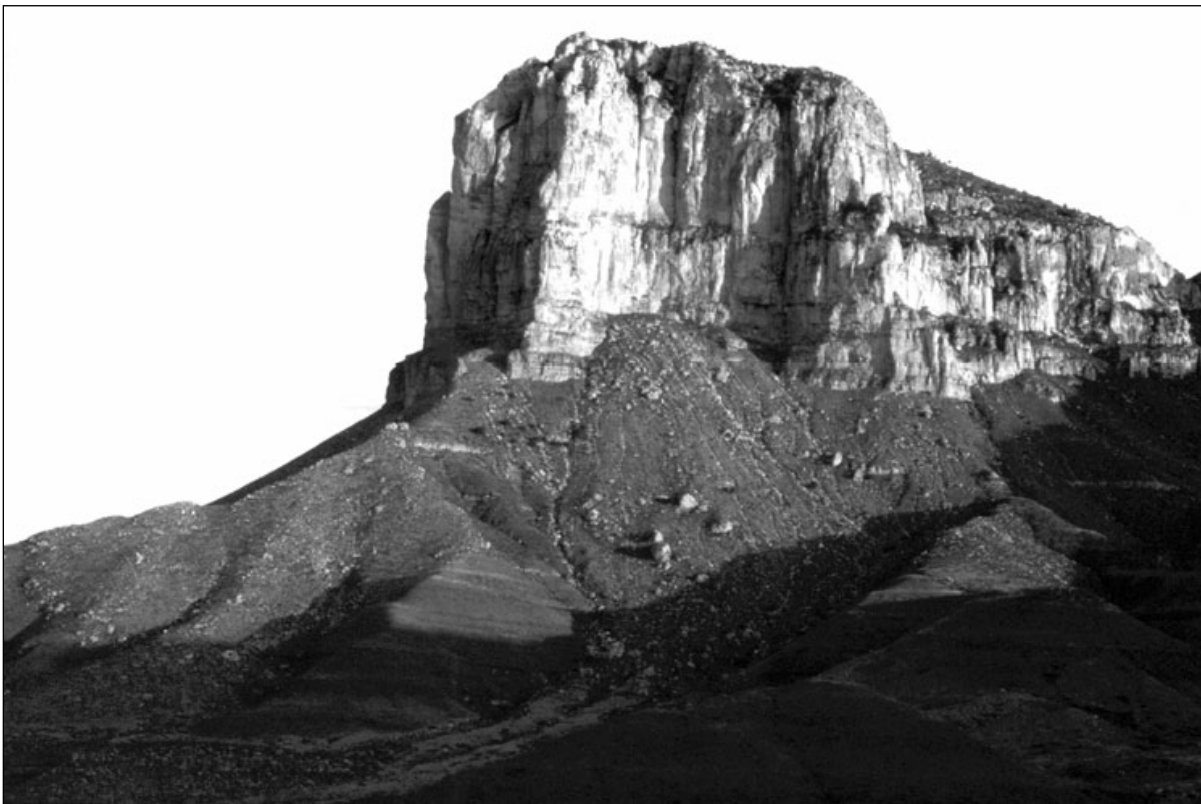


**Pine Springs Trailhead Area.** Management of the trailhead area would be identical to the preferred alternative. This would include continuing tent camping, moving other camping to a new campground, and managing the trailhead area for picnickers and backcountry hikers.

**New Campground.** Alternative C would include a new campground that would have the same characteristics that were described in the preferred alternative.

**New Group Picnic Area.** Alternative C would include a new group picnic area. The siting and layout of this facility could be included in the same development concept plan as the campground. It would involve the same considerations, such as avoidance of archeological sites and habitat for special-status species, which would be employed in designing the campground.

**Administration Facilities.** As described in the preferred alternative, new administration facilities would be constructed within the park south of U.S. Highway 62/180. These would include headquarters offices, new curatorial storage, a parking lot, and utility infrastructure upgrades.



El Capitan

## **Frijole Ranch**

**Management Zoning.** Management zoning around Frijole Ranch would include applying the developed zone in the immediate area of the ranch facilities and zoning the surrounding lands as frontcountry.

**Facilities and Activities.** Frijole Ranch would become a visitor gateway trailhead for expanded, dispersed day-use and overnight camping, consistent with the settings and experiences prescribed in the developed and frontcountry zones. In addition, interpretation at the ranch would be substantially expanded. This area may also have a developed zone for the campground in the Pine Springs vicinity.

The Frijole Ranch house, including landscapes would be rehabilitated and established as a living history working ranch. A refurnished ranch house, new ranching exhibits, and a rehabilitated garden and orchard would provide visitors with an in-depth understanding of the workings and values of a west Texas ranch in the early 1900s. Ranching history would be interpreted by staff and volunteers conducting living history and interpretive programs. The open hours of access would be extended to allow after-hour programs and experiences.

Ranching history exhibits would remain in the Frijole Ranch area but would be relocated from the ranch house to a different structure that would be more suitable for exhibits. Candidate sites could include a rehabilitated barn, another outbuilding, or a new structure. In addition, these new exhibits would enhance visitor opportunities to understand the workings and values of the ranch more than a century ago.

The upgrades that are currently underway at Frijole Ranch for parking, picnicking, and restrooms were described in alternative A. These upgrades represent the existing condition for alternative C.

The loop trail to Smith Spring would be improved, such as providing additional interpretive exhibits. As under A small low-country hike-in campground, identical to that described in the preferred alternative, would provide a backcountry experience with wildland characteristics but without a strenuous climb.

The NPS pack horse operations would be relocated from Frijole Ranch to the new facility in the Pine Springs operations area south of U.S. Highway 62/180, and the site would be restored to a natural condition. The public corral area south of Frijole Ranch could be expanded for potential commercial packers or a horse concession.

## **McKittrick Canyon**

**Management Zoning.** Zoning in the McKittrick Canyon area would be the same as that described for the preferred alternative, except that the canyon from the trailhead to Pratt Cabin would be zoned as frontcountry.

**Facilities and Activities.** McKittrick Canyon would be improved as a visitor gateway that would provide access to a wider variety and number of day-use opportunities. In addition to upgrading the exhibits at the visitor contact station, as described in the preferred alternative, new exhibits and more dispersed interpretive programs would be added. The open hours of access to McKittrick Canyon would be extended to allow after-hour programs and experiences. The goal would be to increase visitor opportunities to experience the park and learn about its resources.

The McKittrick Nature Trail would be redesigned and improved to provide access to the seep for visitors with impaired mobility. Management of the McKittrick Canyon Trail would be much like that described in the preferred alternative. However, this alternative would also include the construction of bridges across the creek to prevent damage to limestone precipitate formations and prevent turbidity.

In addition to its use as an interpretive center, Pratt Cabin would be adapted to accommodate some overnight use to support educational objectives. Additional visitor programs such as walks and interpretive talks, would originate from this location. The Pratt Cabin cultural landscape would be rehabilitated to the Pratt family era.

Restrooms and potable water system would be available for public use in the Pratt Cabin area. Energy would be provided by an enlarged solar power system.

### **Dog Canyon**

**Management Zoning.** This alternative would assign the frontcountry zone to Upper Dog Canyon south of the developed zone to the switchbacks on the Tejas Trail. Otherwise, zoning in the Dog Canyon area would be the same as that described for the preferred alternative.

**Facilities and Activities.** Dog Canyon would become a visitor gateway for expanded, dispersed day-use and overnight camping. In addition, NPS operational facilities would be expanded to improve visitor safety and resource protection throughout the northern part of the park. The National Park Service may consider concessioner operations of the expanded camping and horse facilities under a commercial services agreement. Regardless of the operator, the Dog Canyon area would not include any facilities such as a gasoline station or a store.

The visitor contact station would be improved. In addition, the exhibits along the Indian Meadow Nature Trail would be improved and the trail would be made accessible to visitors with impaired mobility, including those in wheelchairs.

The Dog Canyon trailhead would be expanded, and a new picnic area would be constructed to encourage day-use. The picnic area would include six sites, three of which would have shade shelters. In

addition, the sanitary facilities at the trailhead would be upgraded.

A new trail would be built along Manzanita Ridge between the Tejas and Bush Mountain trails. The new trail segment would complete a loop that would enhance the day-use potential at Dog Canyon. This would involve the construction of approximately 1.5 miles of new trail.

No changes would be made to the tent camping area. The recreational vehicle camping facilities would be upgraded, and a sanitary dump station would be constructed. This alternative also would include the construction of one additional group campground.

The NPS pack horse facilities would remain at Dog Canyon. The corral for public use would be retained and expanded for commercial packers or a horse concession.

As described in the preferred alternative, alternative C would include the enlargement of the Dog Canyon water storage system.

### **Salt Basin Dunes**

**Management Zoning.** The area from the boundary to about a mile inside the park would be zoned frontcountry. On the western part of this area, near the Butterfield Stage Route, the developed zone would be applied to a new activity center. The road from the park boundary to the activity center would be Motorized Scenic Corridor zone. The area, including the dunes, which was found eligible for future consideration as wilderness would be zoned backcountry.

**Facilities and Activities.** The Salt Basin Dunes staging area would be improved as a visitor destination for day-use and overnight camping. The road from the boundary to the new activity center would be substantially upgraded to provide access using low-clearance automobiles and would include a scenic overlook with a wayside exhibit.

Surveys of natural and cultural resources would be conducted prior to the installation

of any facilities to protect them by avoidance. Thereafter, the following facilities would be constructed within the developed zone:

- a contact station
- a gravel parking area
- a trailhead providing access to the dunes
- a comfort station with potable water and flush toilets
- a campground that would be available to tent campers and recreational vehicles
- stabilized pedestrian walks
- utilities, including a wastewater treatment system

Because of the increased activity level at this site, the trail to the Salt Basin Dunes would be improved. Wayside exhibits would be similar to those described for the preferred alternative.

A ranger staff residence would be constructed within the developed zone. This structure would allow the National Park Service to have a 24-hour-per-day presence at the site. A three-bedroom, single-family structure would provide maximum flexibility.

### **Williams Ranch**

**Management Zoning.** Management zoning would be the same as described for the preferred alternative.

**Facilities and Activities.** Williams Ranch would be improved so that the ranch would be a visitor destination for day-use. This would involve substantial changes to the road, as follows:

- A permit would no longer be required to use the road.
- The road would still be single lane but would be upgraded and resurfaced to allow travel by low-clearance vehicles under all weather conditions.
- The installation of drainage structures and pullouts would reduce water damage and would better accommodate travel in both directions.

- The Williams Ranch house interior and exterior would be rehabilitated and would function as a museum. The cultural landscape around the ranch house also would be rehabilitated. A vehicle turnaround and expanded parking would improve traffic movement and accommodate 10 vehicles on a gravel-surface.

### **Other Visitor Facilities**

**Ship-on-the-Desert** would be assigned to the developed zone. The road into the site would be in the motorized scenic corridor zone.

The building and its cultural landscape would be rehabilitated and reused adaptively as the centerpiece for an expanded research and education program that could include cooperative partners in additional facilities. This would be a residential facility supported by partnerships with regional benefactors, scientists, educators, historians, and others. An enlarged and upgraded utility infrastructure would be needed for this development.

**At the PX Well** the National Park Service would pursue a formalized access agreement with landowners...

**At Dell City**, the visitor contact station would be closed. This function would be relocated to the new park contact station at Salt Basin Dunes.

**At the Guadalupe Pass trailhead area**, the National Park Service would formalize an access agreement with landowners as described in the preferred alternative.

## **NATURAL RESOURCES**

Healthy natural resource conditions would be present with evident mitigation measures associated with more widespread visitor access. Management of threatened or endangered species and other species of concern, and management of air quality



would be the same as described for alternative A.

### **Wilderness**

Except for the following changes, the management of wilderness in alternative C would be the same as described in the preferred alternative.

- Alternative C would increase the number and level of development at trailheads that provide access to backcountry and designated wilderness zones.
- Additional developed trails could be constructed within the backcountry and designated wilderness zones and added to the park trail system.
- More widely dispersed waysides and interpretive programs would describe the ecological importance of wilderness.
- Primitive sanitary facilities could be provided at some or all of the 10 designated backcountry campsites.

### **Geological and Paleontological Resources**

Geological and paleontological resources would be managed in a manner similar to that described in alternative A. However, the protection of specific stratotype and fossil locations would be enhanced by developing minimum impact visitor use education programs.

### **Plants and Wildlife**

The goal of all management actions for plants and wildlife would be identical to that described for alternative A.

**Management of Human-Disturbed Ecosystems.** These areas would be managed as described in alternative A. In addition, the recovery of previously grazed areas could be accelerated through a native seed harvest, multiplication, and reseeding program, augmented with aggressive exotic plant control.

**Management of Exotic Species.** The management of exotic plant and animal species, including aoudads that threatened

park resources or public health would be the same as alternative A. Also like alternative A, conditions would be created for natural revegetation. Changes from alternative A would include the following.

- This alternative would have the broader goal of eradicating target species of exotic plants throughout the park.
- It would use mitigation measures to protect plant and animal species and communities from impacts from exotic species.
- Horse use would be expanded to include overnight use in all zones, including the designated wilderness and backcountry zones. More aggressive monitoring and mitigation measures would be used to control the spread of exotic plant species.

### **Management of Wetland and Aquatic**

**Environments.** Wetland and aquatic environments and water quality would be protected by mitigating the impacts of use at developed sites such as trail improvements to protect the fragile wetland resources. The trail at Smith Spring would be improved.

**Management of Research Natural Areas.** Management of these areas would meet NPS standards for resource protection, monitoring, and scientific study. However, in addition to being used for scientific and educational purposes, they would be open to the public on a restricted basis. Park staff would provide research and education activity permits.

### **Water Quality and Quantity**

The management of water resources for this alternative would be similar to those described for the preferred alternative. However, providing for appropriate visitor use would be stressed in the NPS' water management strategy.

## **CULTURAL RESOURCES**

Cultural resource management would emphasize preservation and rehabilitation of

all resources (other than ethnographic resources) for enhanced visitor experiences. Management of ethnographic resources would be the same as described for alternative A.

### **Archeological Resources**

Management of archeological resources would be the same as the preferred alternative.

### **Historic Structures and Landscapes**

Historic structures and landscapes listed in or eligible for listing in the National Register of Historic Places would be rehabilitated and potentially adaptively used. Most cultural sites in the backcountry and wilderness zones would be managed as discovery sites, and their national register eligibility would be determined. As necessary, they would be stabilized and maintained for visitor safety.

The management of historic structures and landscapes associated with visitor facilities throughout the park was described previously under the heading “Facilities and Associated Visitor Activities.” A summary of the key changes that would occur under alternative C includes the following.

- Frijole Ranch and Williams Ranch would be rehabilitated and potentially adaptively used.
- The Pratt Cabin interior would be rehabilitated and adaptively used for overnight accommodations to support educational programs.
- Ship-on-the-Desert would be rehabilitated for adaptive use as discussed under facilities.

The Cox and Bowl Cabins would be stabilized and/or preserved, as appropriate, as discovery sites.

### **Collections**

Collections would be stored in conditions consistent with NPS preservation and security standards within the region. This would be accomplished by consolidating a

substantial portion of the collections and archives in a state-of-the-art facility developed in a regional community. Collection would be jointly managed with a research and education institution outside the park.

## **VISITOR USE AND UNDERSTANDING**

Many elements of visitor use and understanding already have been described in other elements of alternative C, particularly including “Facilities and Associated Visitor Activities.” To avoid repetition, this section focuses on the broad nature of visitor use and understanding that would be associated with this alternative, plus features that contribute to visitor use and understanding that were not covered previously.

Alternative C would expand opportunities for visitors to enjoy a wider range of park settings. New park access and facility improvements would provide activities, interpretation, and visitor gateways to the interior of the park from the south and west, with recreation opportunities for more diverse visitor groups.

### **Visitor Experience**

Exhibits would provide a basic understanding of the park’s geological and natural history in the park’s main visitor center at Pine Springs. However, this alternative would place less emphasis on exhibits, and opportunities to understand the major interpretive themes in the park would remain unchanged from alternative A.

Frijole Ranch would be interpreted as a living history working ranch. A refurnished ranch house, new cultural exhibits and a rehabilitated garden and orchard would provide visitors with an in-depth understanding of the workings and values of a turn-of-the century west Texas ranch. Visitors also would come into contact with abandoned farm and ranch ruins throughout



the park. Through these experiences, they would have the opportunity to explore and better understand the nature of ranching in a severe environment.

Opportunities to understand wilderness values and leave-no-trace standards would be available to all visitors seeking a backcountry experience either through day hikes into the park's backcountry or through a backcountry permit allowing overnight use. Wilderness values and ethics would be emphasized in all interpretive activities. More visitors would be able to develop an understanding and experience of solitude because of the improved ease of access to some currently more remote areas of the park.

A wider diversity of visitors would be accommodated in the campgrounds in the park. This would lead to opportunities for increased understanding of the value of clear night skies.

### **Visitor Education, Interpretation, and Orientation**

Consistent with this alternative's theme of enhanced experience opportunities, the park's education, interpretation, and orientation would be expanded not only in centralized visitor facilities, but also on trails and in other use areas. Exhibits at the visitor center, Pratt Cabin, and contact stations in McKittrick Canyon and Dog Canyon would be enhanced to orient visitors to the increased interpretive opportunities throughout the park. The presentation of a living history working ranch at Frijole Ranch would provide a dynamic education and interpretation opportunity that currently is not available in the park.

Pratt Cabin would be adapted to accommodate some overnight use to support educational objectives. Ship-on-the-Desert would become the centerpiece for an expanded research and education program that could include cooperative partners in additional facilities. In addition, there would

be dispersed enhanced interpretive programs and activities.

A substantially expanded and improved interpretive wayside exhibits program that was more widely dispersed parkwide would emphasize the ecological importance of wilderness and the park's significance. This would include new visitor orientation and wayside exhibits at the Salt Basin Dunes. The Salt Basin Dunes facilities and exhibits would replace the need for the Dell City contact station, which would be closed.

### **Interpretive and Educational Outreach Programs and Media**

Education, outreach, interpretive and orientation programs, and media would focus on personal services and activities dealing with an outreach to a wider range of audiences. These would include people who have not traditionally used the park.

- Interpretive programs emphasizing better orientation would be developed for major visitor centers and contact stations. A greater emphasis would be placed on field interpretation.
- Programs would be developed in coordination with park visits from groups, such as those providing environmental education.
- Outreach and partnership programs would be expanded to El Paso and Juarez.
- The park staff would increase interaction with regional and national media, including newspapers, radio, and television.
- Internet sites that highlight park resources and values with an emphasis toward local and regional populations would be developed.

### **Visitor Access, Circulation, and Parking**

**Visitor Access.** Alternative C would expand overnight access to the park through the addition of new or expanded camping

facilities, other overnight accommodations, and increased horse use.

- Expanded opportunities for overnight stays for all levels of camping would be available in the new, larger campground that would be located in the vicinity of Pine Springs or Frijole Ranch.
- A small, low-country, hike-in campground below the eastern escarpment about 2 miles from the Frijole Ranch parking lot would provide a less challenging backcountry experience.
- Pratt Cabin in McKittrick Canyon would be adapted to accommodate some overnight use to support educational objectives.
- An additional group campsite would be added at Dog Canyon to encourage groups, particularly from the west Texas and southern New Mexico area, to use the site.
- A small campground that would be available to tent campers and recreational vehicles would be constructed at the Salt Basin Dunes trailhead.
- At Ship-on-the-Desert, the building would be reused adaptively as the centerpiece for an expanded research and education program that could include overnight stays in this and additional facilities.
- The National Park Service would formalize an access agreement with landowners.
- Overnight horse use in the backcountry and designated wilderness zones would be allowed under this alternative.

**Circulation.** Internal circulation would be improved by upgrading or constructing roads in two areas.

- The single-lane road from the park's west boundary to an area about mile west of the Salt Basin Dunes would be improved to provide access by low-clearance vehicles.

- Access to Williams Ranch would be improved by upgrading the single -lane road to provide all-weather access by low-clearance vehicles.

**Parking.** Additional parking would be provided at several sites throughout the park.

- Additional parking also would be available in the trailhead parking lot at Pine Springs trailhead parking lot because recreational vehicle campers would be moved to the new campground.
- Additional parking would be available in the Pine Springs visitor center parking lot because hikers and backpackers would be able to use the trailhead parking lot. Additionally, most use by NPS staff would move to the new administrative facility south of U.S. Highway 62/180, which would include a parking lot.
- The Salt Basin Dunes trailhead parking lot about a mile east of the park boundary would be improved with a gravel surface.
- Outside the cultural landscape at Williams Ranch, a vehicle turnaround would be constructed and the parking lot would be expanded to accommodate 10 vehicles on a gravel-surface.

### **Hiking Trails, Trailheads, and Horse Use**

**Hiking Trails.** Hiking trails would be added or modified in the developed, frontcountry, and wilderness threshold zones. The goal would be to provide a wider variety of more accessible walking and hiking trails to more diverse destinations. Developed and frontcountry trails would be maintained at a higher standard of width and grade than the wilderness trails in the backcountry and designated wilderness zones. Trail changes could include, but may not be limited to, the following:

- Trails would be constructed from the new campground to the Pine Springs

and Frijole Ranch areas and would provide access to the park's existing trail network.

- The interpretive trail at the Pinery would be improved.
- At Frijole Ranch, the loop trail to Smith Spring would be improved.
- A new trail would be constructed from the Frijole Ranch trailhead to the new hike-in campground below the eastern escarpment.
- The McKittrick Nature Trail would be redesigned and improved to provide access to the seep for visitors with impaired mobility.
- Bridges would be constructed across the McKittrick Creek Trail to prevent damage to limestone precipitate formations and prevent turbidity.
- At Dog Canyon, the Indian Meadow Nature Trail would be improved to provide access for visitors with impaired mobility.

Additional trails may be developed for use by the physically challenged. Hiking and riding trails of more moderate grades may be developed on the southern and western side of the park in both the frontcountry and backcountry zones. Additions to the system of developed trails would occur in the backcountry and designated wilderness zones and could include the following:

- A 1.5-mile-long, new trail would be built along Manzanita Ridge between the Tejas and Bush Mountain Trails.
- The PX Trail could be developed from PX Well to its connection with the Bush Mountain Trail in the high county, a distance of about 3 miles.
- The Kincaid Trail from the foothills on the west side of the park would be improved to its connection with the Bush Mountain Trail in the high county. This developed trail would be about 5.5 miles long.
- An abandoned road from PX Well to Williams Ranch would be developed as a

horse and hiking trail. This road is approximately 9 miles long, and the relatively gentle grade would provide a moderate hike or horse ride.

- The Four Peaks Trail would be developed to connect Guadalupe Peak with three other high points and end at Bush Mountain. This 4-mile-long trail would provide a strenuous hike.

The park's primitive trail inventory also may be increased by mapping hiking trails along other abandoned trails and road traces on the park's west side that date from the area's ranching period.

**Trailheads.** A new trailhead would be constructed in the newly developed area west of the Salt Basin Dunes. The existing trailhead would be improved at Dog Canyon.

A shuttle system would be considered to serve trailheads to allow one-way hiking trips. The shuttle could be operated by the NPS or by a concessioner under a commercial services agreement.

**Horse Use.** The public corral areas south of Frijole Ranch and at Dog Canyon could be expanded for commercial packers or a horse concession. Overnight horse use could be allowed on some trails in the backcountry and designated wilderness zones.

## PARK OPERATIONS

Many elements of park operations would remain the same as in alternative A. Most of the changes that would occur already have been described in other elements of alternative C, particularly including "Facilities and Associated Visitor Activities." They include the following:

- A new administrative facility would be constructed south of U.S. Highway 62/180. Most administrative offices would be moved from the visitor center building to this new facility.
- Sanitation facilities in wilderness threshold zones could be provided or

improved. Sanitary facilities would be provided at backcountry and designated wilderness zone campsites.

- Ship-on-the-Desert would be rehabilitated and would become the centerpiece for research and education programs that could include cooperative partners in additional facilities.
- Operations improvements at Dog Canyon would include an enlarged water storage system.
- A ranger staff residence would be constructed in the vicinity of the new campground and trailhead at the Salt Basin Dunes.
- A shuttle system to serve trailheads would be considered to allow one-way hiking trips.
- A sanitation facility would be constructed at Pine Top patrol cabin in the backcountry zone.

A commercial services plan would be prepared to evaluate the potential for providing park services that are necessary and appropriate through concessioners. Opportunities could include, but would not be limited to, operation of the new campground in the vicinity of Pine Springs or Frijole Ranch, commercial horse operations at Frijole Ranch and/or Dog Canyon, and a hikers' shuttle. However, they would not include any facilities such as a gasoline station or a store.

## BOUNDARY ADJUSTMENT

Alternative C would include a boundary adjustment like that described in alternative A.

## COSTS

The estimated costs to fully implement alternative C were shown in table 4. The costs in the table provide a relative sense of the resources necessary to implement this alternative. The cost estimate has been rounded to the nearest thousand dollars.

These estimates should not be used for budgetary purposes.

The total one-time cost to implement alternative C would be \$15,831,000. This alternative would include extensive facility and non-facility costs, including a new administrative facility, a new campground in the vicinity of Pine Springs or Frijole Ranch, improved visitor contact stations, and improvements to the historic Ship-on-the-Desert and Pratt Cabin structures. The total estimated cost for one-time construction-related actions would be \$12,061,000.

This alternative would include resource management actions, and orientation and interpretation materials. The total for one-time non-facility costs would be \$3,770,000, including \$3,300,000 for resource management and \$470,000 for visitor experience and orientation.

To meet annual operating costs, the estimated base budget would need to be \$3,681,000. The increase would cover the costs of additional employees.

The total number of full-time employees would be 44. Under this alternative, the number of full-time NPS employees would increase to address the additional resource management, maintenance, and visitor services. There may be less operational flexibility because of the increased number of staff necessary to implement the alternative.

The total amount of deferred maintenance in the park would likely remain relatively constant over time. The housing units currently being used for administrative office space would be converted back into housing once the headquarters building was completed. Rehabilitating these structures so that they could again be used as housing would address any deferred maintenance on these structures. Because the contribution of the housing structures to the total deferred maintenance is small, there would be only a nominal change in the deferred maintenance needs at the park.

Over time, new deferred maintenance demand could develop from the increase in facilities at trailheads and more intensive use of some facilities. The National Park Service probably would have less flexibility to

address deferred maintenance actions in a timely manner or to implement priority actions that could be funded from the park budget.

## IMPLEMENTATION

Implementation of the actions proposed in the general management plan would be based on the availability of funding and would occur over time. The park would prioritize implementation to focus on visitor experience and safety, resource protection, and operational efficiency and effectiveness.

It is unlikely that the operating budget for the park would change substantially during the planning horizon for this general management plan. Therefore the park staff would seek ways to increase operational flexibility and efficiency, which would allow park staff to accomplish some tasks proposed in this plan within the existing operational budget. Some additional sources of funding could be available, but such funds

would be limited and could not be relied on to fully implement the selected alternative.

To fully implement the general management plan, the National Park Service would consider other mechanisms, including partnerships and providing some visitor services through a concession operation. It is a priority for park management to build partnerships with park neighbors and others to help preserve common resources, build and sustain a community of volunteers who are actively engaged in stewardship of park resources, and enhance visitor education. Concession operations would be considered for actions determined to be necessary and appropriate commercial visitor services and would be implemented in accordance with a commercial services plan.



El Capitan from Guadalupe Peak

## MITIGATIVE MEASURES

Congress charged the National Park Service with managing the lands under its stewardship “in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (Organic Act, 16 United States Code 1). As a result, the National Park Service routinely evaluates and implements mitigation whenever conditions occur that could adversely affect the sustainability of national park system resources.

To ensure that implementation of the action alternatives would protect unimpaired natural and cultural resources and the quality of the visitor experience, a consistent set of mitigation measures would be applied to actions proposed in this plan. The National Park Service would prepare appropriate environmental review, as required by the National Environmental Policy Act, National Historic Preservation Act, and other relevant legislation, for future actions. As part of the environmental review, the National Park Service would avoid, minimize, and mitigate adverse impacts when practicable.

A compliance-monitoring program would oversee the implementation of mitigation measures and would include reporting protocols. Elements of the monitoring would vary based on resource. For example, compliance monitoring for the protection of soils would be very different from compliance monitoring that was performed to ensure the quality of visitor experiences. Compliance monitoring programs would be developed on a case-by-case basis during implementation planning. Monitoring programs would be consistent with the well-established and successful approaches based on indicators, standards, and management actions that have been implemented at units throughout the national park system. Indicators and standards would be an important component of compliance

monitoring, as described under “Formulation of Management Zones.”

The following mitigation measures and best management practices would be applied to avoid or minimize potential impacts from implementation of the alternatives. These measures would apply to all alternatives. Although this plan does not provide for extensive construction, any construction or other actions would meet these mitigative measures.

## NATURAL RESOURCES

### Air Quality

- Implement a dust abatement program. Standard dust abatement measures could include watering or other measures to stabilize soils, covering haul trucks, employing speed limits on unpaved roads, minimizing vegetation clearing, and revegetating after construction.
- Encourage construction contractors to use low-pollution fuels and low-emission vehicles.
- Encourage construction companies to use equipment that has been retrofitted to reduce emissions.
- Limit the amount of time construction vehicles idle.
- Encourage drivers of recreational vehicles and tour buses to not let their engines idle.

### Exotic Species

Implement a noxious weed abatement program. Standard measures could include ensuring construction-related equipment arrives on the site free of mud or seed-bearing material, certifying all seeds and straw material as weed-free, identifying areas of noxious weeds before construction begins, requiring visitors to certify that all horse feed, including hay, that is carried into the park is weed free, treating noxious weeds

or noxious weed topsoil before construction, and revegetating with appropriate native species.

### **Soils**

Build new facilities on soils suitable for development. Minimize soil erosion by limiting the time that soil is left exposed. Apply erosion control measures, such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies. To conserve available organic matter, any topsoil that is present would be retained and replaced. Once work was completed, revegetate construction areas with native plants in a timely period. Monitor for visitor impacts, particularly in sensitive or highly visited areas.

### **Paleontological Resources**

Collect and/or stabilize (in place) fossils that might be destroyed or damaged by construction and maintenance activities.

### **Rare, Threatened, and Endangered Species**

Mitigation actions would occur during normal park operations as well as before, during, and after construction to minimize immediate and long-term impacts to rare, threatened, and endangered species. These actions would vary by specific project and area of the national park affected. Many of the measures listed below for vegetation and wildlife would also benefit rare, threatened, and endangered species by helping to preserve habitat. Mitigation actions specific to rare, threatened, and endangered species would include the following:

- Conduct surveys for rare, threatened, and endangered species, as warranted.
- Site and design facilities or actions to avoid adverse effects on rare, threatened, and endangered species. If avoidance is infeasible, minimize and compensate for adverse effects on rare, threatened, and

endangered species as appropriate and in consultation with the appropriate resource agencies.

- Develop and implement restoration and/or monitoring plans, as warranted. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- Implement measures to reduce adverse effects of nonnative plants and wildlife on rare, threatened, and endangered species.

### **Plant Communities and Vegetation**

- Monitor areas used by visitors, such as trails, for signs of native vegetation disturbance, such as trampling of vegetation, social trails, and widening of trails beyond constructed width through use. Use public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers to control potential impacts on plants from trail erosion or social trailing.
- Use barriers and closures to prevent trampling and loss of riparian vegetation.
- Develop revegetation plans for the disturbed area and require the use of native species. Revegetation plans should specify measures such as seed or plant source, seed and plant mixes, and soil preparation. Salvage vegetation should be used to the maximum extent possible.

### **Water Resources**

- To prevent water pollution during construction, use erosion control measures, minimize discharge to water bodies, and regularly inspect construction equipment for leaks of petroleum and other chemicals.
- Build a runoff filtration system to minimize water pollution from larger parking areas.
- Work to minimize erosion from trails.



## Water Quality

Continue to remove horse manure from the park operations corrals daily to reduce the potential for water quality impacts associated with nonpoint source pollution. Park staff will also remove horse manure from public corrals if visitors fail to do so. Horses are not allowed in McKittrick Canyon, the only area of the park with a trail close to a primary perennial source of water.

## Wetlands

- Delineate wetlands and apply protection measures during construction. Wetlands would be delineated by qualified NPS staff or certified wetland specialists and clearly marked before construction work. Perform construction activities in a cautious manner to prevent damage caused by equipment, erosion, or siltation.
- Improve trails through wetland areas to minimize impacts on vegetation.

## Wildlife

- Employ techniques to reduce impacts on wildlife, including visitor education programs, restrictions on visitor activities, and park ranger patrols.
- Implement a natural resource protection program. Standard measures would include construction scheduling, biological monitoring, erosion and sediment control, the use of fencing or other means to protect sensitive resources adjacent to construction, the removal of all food-related items or rubbish, topsoil salvage, and revegetation. This could include specific construction monitoring by resource specialists as well as treatment and reporting procedures.
- Schedule activities in or near water sources to minimize disturbance to wildlife. For example, when water is scarce, the park would seek to avoid activities that would cause wildlife to avoid what water is available.

## CULTURAL RESOURCES

The National Park Service would preserve and protect, to the greatest extent possible, resources that reflect the human occupation of what is now Guadalupe Mountains National Park. Specific mitigation measures, if needed, would include the following:

- Subject projects to site-specific planning and compliance. Make all efforts to avoid adverse impacts through use of the Secretary of the Interior's (1983) *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines*, and by using screening and/or sensitive design that would be compatible with historic resources. If adverse impacts could not be avoided, mitigate these impacts through a consultation process with all interested parties.
- Before disturbing or modifying any cultural resources that are eligible or listed in the National Register of Historic Places, consult with the Texas state historic preservation office (Texas Historical Commission) and any appropriate traditionally associated American Indian tribes.
- Inventory all unsurveyed areas in the park for archeological, historical, and ethnographic resources as well as cultural and ethnographic landscapes. Conduct archeological surveys in unsurveyed areas where development would occur to determine the extent and significance of archeological resources in the areas.
- Document cultural and ethnographic landscapes in the park and identify treatments.
- Conduct archeological site monitoring and routine protection. Conduct data recovery excavations at archeological sites threatened with destruction, where protection or site avoidance during design and construction is infeasible.
- Avoid or mitigate impacts on ethnographic resources. Mitigation

could include identification of and assistance in accessing alternative resource gathering areas, continuing to provide access to traditional use and spiritual areas, and screening new development from traditional use areas.

- Continue ongoing consultations with traditionally associated American Indian tribes. Protect sensitive traditional use areas to the extent feasible.
- Implement mitigation measures for structures and landscapes, including documentation according to standards of the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscape Survey (HABS/HAER/HALS). The level of this documentation, which includes photography, archeological data recovery, and/or a narrative history, would depend on significance (national, state, or local) and individual attributes (such as an individually significant structure, or individual elements of a cultural landscape). The appropriate level of documentation would be determined in consultation with the state historic preservation officer. When demolition of a historic structure is proposed, architectural elements and objects may be salvaged for reuse in rehabilitating similar structures, or they may be added to the park's museum collections. In addition, the historical alteration of the human environment and reasons for that alteration would be interpreted to national park visitors.
- Whenever possible, modify project design features to avoid effects on cultural resources. New developments would be relatively limited and would be located on sites that blend with cultural landscapes and that are not adjacent to ethnographic resources. If necessary, use vegetative screening to minimize impacts on cultural landscapes and ethnographic resources.
- Encourage visitors through the park's interpretive programs to respect and

leave undisturbed any inadvertently encountered archeological resources, and to respect and leave undisturbed any offerings placed by American Indians.

- Strictly adhere to NPS standards and guidelines on the display and care of artifacts. This would include artifacts used in exhibits in the visitor facilities. Irreplaceable items would be kept above the 500-year floodplain.

## VISITOR SAFETY AND EXPERIENCES

- Implement a traffic control plan, as warranted. Standard measures include strategies to maintain safe and efficient traffic flow during the construction period.
- Implement measures to reduce adverse effects of construction on visitor safety and experience.
- Implement an interpretation and education program. Continue directional signs and education programs to promote understanding among national park visitors.
- Based on the completed accessibility study that identifies barriers to park programs and facilities for people with impaired mobility, implement a strategy to provide the maximum level of accessibility.

## HAZARDOUS MATERIALS

Implement a spill prevention and pollution control program for hazardous materials. Standard measures could include hazardous materials storage and handling procedures; spill containment, cleanup, and reporting procedures; and limitation of refueling and other hazardous activities to upland or nonsensitive sites.

## NOISE ABATEMENT

Implement standard noise abatement measures during construction and daily park operations. Standard noise abatement

measures could include a schedule that minimizes impacts on adjacent noise-sensitive uses, the use of the best available noise control techniques wherever feasible, the use of hydraulically or electrically powered impact tools when feasible, and the location of stationary noise sources as far from sensitive uses as possible.

Mitigation measures would be applied to protect the natural sounds in the national park. Specific actions could include, but would not be limited to siting and designing facilities to minimize objectionable noise, and exploring opportunities to reduce the sounds of human-caused noise.

### **SCENIC RESOURCES**

Design and implement mitigation measures to minimize visual intrusions. These include the following:

- Where appropriate, use facilities fences to route people away from sensitive natural and cultural resources, while still permitting access to important viewpoints.
- Design, site, and construct facilities to avoid or minimize adverse effects on natural and cultural resources and visual intrusion into the natural and/or cultural landscape.
- Provide vegetative screening, where appropriate.
- Work with owners of adjacent properties to protect air quality, which affects scenic views.

### **SOCIOECONOMIC ENVIRONMENT**

During the future planning and implementation of the approved general management plan for Guadalupe Mountains National Park, the National Park Service would work with local communities and county governments to further identify potential impacts and mitigation measures that would best serve the interests and concerns of both the National Park Service and the local communities. Partnerships would be pursued to improve the quality and diversity of community amenities and services.

### **SUSTAINABLE DESIGN AND AESTHETICS**

Avoid or minimize adverse project impacts on natural and cultural resources. Development projects, such as buildings, utilities, roads, bridges, or trails, or reconstruction projects, such as road reconstruction, building rehabilitation, or utility upgrades, would be designed to work in harmony with the surroundings, particularly in historic landscapes. Projects would reduce, minimize, or eliminate air and water nonpoint-source pollution. Projects would be sustainable whenever practicable, by

- recycling and reusing materials
- minimizing materials
- minimizing energy consumption during the project construction
- minimizing energy consumption throughout the lifespan of the project

## FUTURE STUDIES AND IMPLEMENTATION PLANS

A number of studies and plans are required to implement this general management plan.

### SPECIFIC PLANNING DOCUMENTS

The documents that would be necessary to implement this general management plan under the various alternatives are as follows.

#### Alternative A

As situations arise, the National Park Service will prepare environmental compliance actions and other planning-related documents, as necessary.

#### Preferred Alternative

The following specific planning documents would be necessary to implement the actions that would be part of the preferred alternative.

1. A Pine Springs campground development concept plan would identify the location and design of a new campground for the Pine Springs area.
2. A Salt Basin Dunes development concept plan would identify access routes, trails, and the facility and public services layout for visitors.
3. A Frijole Ranch development concept plan would identify parking, picnic area, and restroom locations and would determine how best to preserve the historic cultural landscape.
4. Exhibits plans would be prepared for the expanded natural, geological, and cultural resources and wilderness exhibits at the Pine Springs visitor center.
5. A wilderness study would be completed on those areas identified as eligible for wilderness, and a wilderness study recommendation would be made to Congress.

6. A site plan and construction plans would be prepared for the construction of a new administration complex to be built in the Pine Springs developed zone near the maintenance area.
7. A commercial services plan would be prepared to evaluate the potential for providing park services that are necessary and appropriate through commercial services agreements.

#### Alternative B

In addition to plans 2, 3, 4, and 5 under the preferred alternative, the following specific planning documents would be necessary to implement actions identified as part of alternative B.

1. A restoration plan would be prepared for the oak woodland after removal of the Pine Springs campground.
2. A restoration plan would be prepared for the area from which horse operations were removed at Pine Springs and Dog Canyon.

#### Alternative C

In addition to plans 5, 6, and 7 listed under the preferred alternative, the following specific planning documents would be necessary to implement actions identified as part of alternative C.

1. The Pine Springs campground development concept plan would be expanded to identify the location and design of a new group picnic area also in the Pine Springs area.
2. A development concept plan for the Salt Basin Dunes would plan the location and design of the contact station, campground, ranger station, access routes, trails, roads, parking and picnic areas, and the facility and public services layout.

3. A Frijole Ranch development concept plan would identify the site characteristics and location of a cultural museum, and would locate the parking area, picnic area, and restroom to preserve the historic cultural landscape.
4. Frijole Ranch cultural museum adaptive use/construction plans would guide the adaptive reuse of an existing outbuilding or the construction of a new museum facility.
5. A historic furnishings plan would guide the rehabilitation and furnishing of the interior of Frijole Ranch house to interpret the site as a living history ranch.
6. A trail development plan would identify the location and construction plans for proposed new trails and for bridge construction on McKittrick Trail.
7. An exhibit plan would guide cultural exhibits for the Williams Ranch interior.

## IMPLEMENTATION PLANS

The following implementation plans would be needed for different aspects of park management under all alternatives. Implementation plans are needed to fulfill the requirements to adequately manage the park, and are identified as requirements by Department of the Interior or NPS policy, government regulation, or other sources. The content of these plans may vary, depending on the alternative selected.

However, the goals, objectives, and overall direction for all implementation plans are established in this general management plan, which is the umbrella document from which all future planning efforts will tier.

Implementation plans require periodic review and revision, as well as environmental compliance and public review. Implementation plans will include, but may not be limited to, the following:

- *Cave Management Plan, Guadalupe Mountains National Park* — last revised in 1991
- *Land Protection Plan* — last revised in 1992
- *Backcountry/Wilderness Management Plan* — last revised in 1995
- *Superintendent's Statement for Management* — last revised in 1995
- *Fire Management Plan for Guadalupe Mountains National Park* — last revised in 2005
- resource stewardship strategy has recently been completed
- desert bighorn sheep reintroduction plan
- long-range interpretive and program management plan, which would define specific goals and recommendations for interpretation
- McKittrick Canyon management plan
- nonnative species (aoudad) removal plan

## ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in Section 101 of the National Environmental Policy Act of 1969. The environmentally preferred alternative is determined by applying the criteria in the National Environmental Policy Act, which are listed in table 5, in a manner consistent with the Council on Environmental Quality's (1978) implementing regulations. According to section 101, the environmentally preferred alternative would also "create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

In the National Park Service, the requirement to identify the environmentally preferred alternative is met by

- disclosing how each alternative meets the criteria (in table 5) set forth in section 101(b) of the National Environmental Policy Act
- presenting any inconsistencies between the alternatives analyzed and other environmental laws and policies (NPS 2001a DO-12)

Alternative A, No Action / Continue Current Management, meets criterion 1 (fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations) and criterion 4 (preserving important natural and cultural resources). The establishment of the park removed park lands and their natural and cultural resources from human-caused change, preserving natural resources in their natural state and cultural resources in their present condition for future generations to appreciate and enjoy.

**Table 5: Environmentally Preferred Alternative Analysis**

CRITERIA	ALTERNATIVE A	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.	X	X	X	X
2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.		X	X	X
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.		X		
4. Preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice.	X	X	X	X
5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.		X		
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.	X	X	X	X
Total criteria met	3	6	4	4

Alternative A also meets criterion 6 (to enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources). All facilities rehabilitated would achieve the maximum in sustainability, would conserve resources and energy use, and would achieve the longest life possible.

Alternative B is a minimal development, maximum preservation alternative.

Alternative B has all of the advantages of alternative A in meeting criteria 1 and 4, and would be more effective in meeting criterion 6 because any new facilities would be constructed to achieve the maximum in sustainability, conserve resources and energy use, and achieve the longest life possible. In addition, alternative B meets criterion 2 by taking a more aggressive posture in preserving natural conditions while providing minimal developed or formalized amenities and upgrading or removing dilapidated, unused, or dangerous facilities. This alternative is less effective than others with regard to criterion 3; it reduces the range of beneficial uses for many visitors because there is no camping except in the backcountry, and no horseback riding. For criterion 5, there are fewer opportunities for many visitors to experience the park except through the visitor center exhibits.

Alternative C also would preserve most undeveloped areas, protect natural resources, and safeguard cultural resources. However, to achieve the goal of enhanced visitor experiences and opportunities, this alternative would provide for the most development at more sites compared to the other alternatives. Alternative C would meet criteria 1, 4, and 6, although not as well as the no action alternative or alternative B, and would be as effective as alternative B in meeting the second criterion.

The preferred alternative would achieve a balance of resource preservation similar to alternative B while providing many of the enhanced experience opportunities of alternative C. Therefore, it would be as

effective as these alternatives in meeting criteria 1, 2, 4, and 6. The preferred alternative also meets criterion 3 by attaining the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences through the balanced use of natural and cultural resources and human developments.

The preferred alternative meets criterion 5 by achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities while conserving and protecting resources for use and enjoyment. Working with surrounding landowners to achieve mutual land management objectives is consistent with the alternative.

Under the preferred alternative, some visitor experiences would be improved. The visitor experience for tent campers at Pine Springs would be enhanced because recreational vehicles and groups would be relocated to a proposed campground. Similarly, visitors traveling by recreational vehicle would have an improved experience because they would have the opportunity to camp in an area designed for their use. In contrast, alternative B would provide fewer visitor activities because overnight camping would no longer be available at Pine Springs and horseback riding would be prohibited in the park.

The preferred alternative would increase access into the park but would limit the size of the development footprint. Alternative C also would provide visitors with more opportunities to access the park, but it would have a larger development footprint with resulting impacts on resources, particularly on the west side of the park near the Salt Basin Dunes. For these reasons, the preferred alternative is more effective in meeting criterion 3 by attaining the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

Under the preferred alternative, the National Park Service would continue to work with surrounding landowners, tribes and other interested members of the public to achieve mutual land management objectives. Because of these actions and the characteristics of alternatives B and C described above, the preferred alternative also would best meet criterion 5, achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities while conserving and protecting resources for use and enjoyment.

The environmentally preferred alternative in this environmental impact statement is the NPS' preferred alternative. The preferred alternative exceeds the other alternatives in realizing the full range of the Section 101 National Environmental Policy Act goals, based on greater improvements to natural and cultural resource preservation, visitor and employee safety, and park operations and long-term operational costs.



## ALTERNATIVES OR ACTIONS CONSIDERED BUT DISMISSED FROM DETAILED EVALUATION

Public involvement, including scoping, that was conducted in association with preparing this general management plan is described in Chapter 5: Consultation and Coordination. Some of the alternatives or actions suggested during scoping were not incorporated into this general management plan. Consistent with Section 1502.14 of the Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act, this section identifies those alternatives or actions and briefly discusses the reasons why they were eliminated.

As described in Chapter 5, the identification of issues and development of alternatives provided opportunities for public and agency input through responses to newsletters, at meetings, and via the Internet. However, not all actions suggested by the public and agencies were incorporated into the alternatives that are analyzed here. Actions or alternatives were eliminated from further consideration because they:

- were not feasible
- are already prescribed by law, regulation, or policy
- would be in violation of laws, regulations, or policies
- were too detailed for the broad scope of a general management plan

The complete list of public suggestions from scoping, summarized by category, is provided in appendix F. This section briefly describes each of these suggestions and the basis for excluding each from this general management plan.

### Resource Management

- Preserve unique flora, fauna, geologic, and paleontological resources — This already is required by federal law.
- Protect historical, archeological, and ethnographic resources — This already is required by federal law.

- Protect air quality — Although the park is classified as a class 1 air quality management area, the park staff has limited ability to address air pollution that drifts to the park from regional sources, particularly pollution sources in Mexico.
- Actions that impair resources — Federal law requires that park resources must be protected from impairment.
- Allow grazing, fishing, and hunting — When these activities are not specifically included in the park's enabling legislation, they are prohibited by federal regulation. The enabling legislation for Guadalupe Mountains National Park does not include hunting and grazing.
- Provide artificial water sources for wildlife — Unjustified intervention in natural water sources could impact the natural ecological system in violation of NPS policies.
- Control park weed and predator impacts on neighboring ranches — Specific resource management measures that address park impacts on adjacent lands would be addressed in the park's resource stewardship plan that would tier from this general management plan.
- Protect resources on adjacent private lands — NPS policy directs park managers to work with adjacent owners to promote land management that is compatible with NPS resource preservation values.
- Return Manzanita Spring to natural conditions by allowing it to silt in — A cultural landscape inventory report was completed for the Frijole Ranch in 2006. The report determined that Manzanita Spring is an important component of the ranch's cultural landscape. The spring pool has been artificially maintained through dredging since early pioneer days. Returning the spring to natural conditions would be an adverse action on the historic integrity of the site. Therefore this action

has been dismissed and is no longer included in alternative B.

### Public Use and Understanding

- Reduce or expand designated wilderness areas — Park lands can only be designated or undesignated as wilderness by Congress.
- Eliminate public access and use — Public use that is consistent with resource preservation must be provided as required by federal law.
- Allow motor vehicle access to the high country — Most of the high country lands have been designated by Congress as wilderness, which prohibits motor vehicle use.
- Allow mountain bike use on trails — Mountain bike use is prohibited on park trails by federal regulation; however, mountain biking is permitted on all park roads open to motor vehicles.

### Facilities and Operations

- Quality of park facilities — NPS policy requires park facilities to be harmonious with park resources, compatible with natural processes, aesthetically pleasing, functional, energy-efficient, cost-effective, and as accessible as possible to all segments of the population (federal law).
- Sell or lease portions of park lands — This would violate federal law.
- Relationship with park neighbors — NPS policy directs park managers to work with adjacent owners on shared resource preservation issues.
- Public trespassing or uses outside the boundaries — NPS policy directs park managers to work with adjacent owners on issues of concern such as trespassing.

### Other Considerations

A preliminary alternative, designated “D,” was discussed in *Newsletter 2*. This preliminary alternative was eliminated from further consideration because the National Park Service determined that while coordination of

management objectives with neighboring landowners (federal and private) is a goal of park management, all of the coordination, cooperation, and partnership activities emphasized in that alternative should take place whenever possible in all alternatives.

The master plan for managing and developing Guadalupe Mountains National Park (NPS 1976) included a proposal to develop a tram to the top of Guadalupe Peak. An impact analysis identified many unresolved questions regarding the tram. The wilderness boundaries designated in the 1978 wilderness designation excluded the route of the proposed tram from wilderness designation because of these unresolved issues. Subsequently, formal engineering studies were conducted on the tram proposal. They concluded that it was not feasible to construct a tram in this area because of the high winds, and that a tram would be economically infeasible to construct and maintain. As a result, the tram proposal has been dropped from further consideration, and the tram corridor can now be included for consideration in the planned wilderness study.

The possibility of rerouting Highway 62/180 was suggested, so that highway traffic would not be going through the park and the road through the park could be a more leisurely, scenic route. This was dismissed as economically unfeasible. It was suggested that a road should be constructed from Williams Ranch north along the bajadas to near the northern boundary at PX Well. This road was dismissed from further consideration because it would require construction of numerous bridges and culverts, resulting in prohibitive costs. In addition, it would cross lands that have been found eligible for future consideration as wilderness. A suggestion to create an all-weather, low-clearance vehicle road along an old trace from Williams Ranch to the park’s west boundary was dismissed because it would be inconsistent with the findings of the wilderness eligibility assessment described in appendix D.

## SUMMARIES

NPS guidance in *Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a) requires that environmental impact statements include several summaries that will facilitate reader understanding. The important features of each alternative are summarized in table 6. Detailed descriptions of the features of each alternative were provided earlier in this section.

The NPS guidance in Director's Order 12 states that another summary should present "the impacts of each alternative, including a determination of potential improvement to park resources." Table 7 provides a brief summary of the effects of each of the alternatives on the impact topics retained for analysis.

- Table 7 includes both adverse and beneficial effects of the alternatives and identifies their intensity (negligible, minor, moderate, or major), duration (short-term or long-term), geographic area of effect, and whether they would be direct or indirect.
- The table also summarizes whether unacceptable impacts or effects would occur to the park's scenery, natural and historic objects, or wildlife such that they could not be enjoyed by future generations.

More detailed information supporting table 7 on the effects of the alternatives is provided in Chapter 4: Environmental Consequences.

A summary of how each alternative would achieve the requirements of Sections 101 and 102(1) of the National Environmental Policy Act was included in the text and table 5 under the heading "Environmentally Preferred Alternative."



Agave in High Country

**Table 6: Features of the Alternatives**

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Facilities and Associated Visitor Activities				
Pine Springs	Continue current management.	<p>Apply management zoning to include developed, frontcountry, wilderness threshold, and backcountry zones.</p> <p>Move most office space out of the visitor center and remodel to add exhibit space and areas for other interpretation and education activities.</p> <p>Enhance existing exhibits and add cultural resource exhibits from Frijole Ranch.</p> <p>Move recreational vehicle camping from the trailhead parking lot. Manage the trailhead area for hikers and picnickers.</p> <p>Construct a new, larger campground. Consider contracting the operation of this facility under a commercial services agreement.</p> <p>Construct new administrative facilities south of U.S. Highway 62/180.</p>	<p>Apply management zoning to include developed, frontcountry, wilderness threshold, and backcountry zones.</p> <p>Enhance existing exhibits and add cultural exhibits from Frijole Ranch and new wilderness exhibits.</p> <p>Eliminate all camping in the area and restore tent campground to a natural condition.</p> <p>Manage the trailhead area for wilderness hikers and picnickers.</p> <p>Address administrative needs by adapting existing structures in the housing area south of U.S. Highway 62/180.</p>	<p>Apply management zoning to include developed, frontcountry, wilderness threshold, and backcountry zones.</p> <p>Remodel the visitor center for new exhibits and space for programs, classrooms, and group events. Keep existing exhibits and add cultural, wilderness, and leave-no-trace exhibits. Expand orientation.</p> <p>Improve interpretive walk at the Pinery area</p> <p>Move recreational vehicle camping from the trailhead parking lot. Manage the trailhead area for hikers and picnickers.</p> <p>Construct a new group picnic area.</p> <p>Construct a new, larger campground. Consider contracting the operation of this facility under a commercial services agreement.</p> <p>Construct new administrative facilities south of U.S. Highway 62/180.</p>
Frijole Ranch	Continue current management.	<p>Apply management zoning to include developed, frontcountry, and wilderness threshold zones.</p> <p>Move cultural resource exhibits from Frijole Ranch house to the visitor center.</p> <p>Rehabilitate outbuildings, garden, and orchard as an integrated cultural landscape that interprets west Texas ranching history from around 1900.</p> <p>Develop a small, hike-in campground below the eastern escarpment that was accessible from the parking lot trailhead.</p> <p>Maintain the public corral.</p>	<p>Apply management zoning to include developed, frontcountry, and wilderness threshold zones.</p> <p>Continue to manage for day-use only.</p> <p>Remove the public corral and NPS pack animal operations.</p>	<p>Apply management zoning to include developed and frontcountry zones.</p> <p>Change the area to be a visitor gateway for expanded, dispersed day-use and overnight camping.</p> <p>Establish a living history working ranch with a refurbished ranch house, new cultural exhibits, and a rehabilitated cultural landscape.</p> <p>Relocate the ranching exhibits from the ranch house to another onsite structure.</p> <p>Improve the trail to Smith Spring. Develop a small, hike-in campground below the eastern escarpment that was accessible from the parking lot trailhead.</p> <p>Expand the public corral for commercial packers or a horse concession. Consider contracting the operation of this facility under a commercial services agreement.</p>

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
McKittrick Canyon	Continue current management.	Apply management zoning to include developed, wilderness threshold, and designated wilderness zones. Upgrade the visitor contact station. Improve the McKittrick Nature Trail. Use Pratt Cabin as an interpretive center, preferably without sanitary facilities.	Apply management zoning to include developed, wilderness threshold, and designated wilderness zones. The visitor contact station would emphasize self-discovery opportunities, wilderness, and leave-no-trace use of the land. Restrooms would not be provided in the Pratt Cabin area.	Apply management zoning to include developed, frontcountry, and designated wilderness zones. Develop the area as visitor gateway with a wider variety and number of opportunities. Upgrade the visitor contact station. Improve the McKittrick Nature Trail to provide access to the seep for visitors with impaired mobility. Manage the McKittrick Canyon Trail to improve resource protection, despite increased use. Construct bridges across the creek to protect limestone precipitate formations and prevent turbidity. Provide water and restrooms at Pratt Cabin and use the building as an interpretive center with some overnight use and visitor programs. Expand the solar power system to provide electricity to this facility.
Dog Canyon	Continue current management.	Apply management zoning to include developed, wilderness threshold, and designated wilderness zones. Enlarge the water storage system.	Apply management zoning to include developed, wilderness threshold, and designated wilderness zones. Remove recreational vehicle camping and restore the site to a natural condition. Enlarge the water storage system. Remove the public horse corral and NPS pack horse operation, and restore the sites to a natural condition.	Apply management zoning to include developed, frontcountry, and designated wilderness zones. Develop the area as a visitor gateway with a wider variety and number of day-use and overnight camping opportunities. Improve and expand the visitor contact station. Improve the Indian Meadow Nature Trail to provide access for visitors with impaired mobility. Construct a new trail segment between the Tejas and Bush Mountain Trails to create a loop trail. Expand the trailhead and construct a picnic area. Construct one new group campsite. Upgrade the recreational vehicle camping area and provide a sanitary dump station. Expand the public corral for commercial packers or a horse concession. Consider contracting the operation of the camping and horse facilities under a commercial services agreement. Enlarge the water storage system.

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Salt Basin Dunes	Continue current management.	<p>Apply management zoning to include frontcountry, motorized scenic corridor, and backcountry zones.</p> <p>Minimally upgrade the road.</p> <p>Create a new trailhead about a mile within the park with a parking lot, picnic tables, and restroom. Visitors could hike about a mile to the dunes on a primitive trail.</p> <p>Improve orientation and interpretation.</p>	<p>Apply management zoning to include frontcountry, wilderness threshold, and backcountry zones.</p> <p>Create a new trailhead just inside the park boundary with a parking lot, picnic tables, and restroom. Visitors could hike about 2 miles to the dunes on a primitive trail.</p> <p>Remove former small parking lot and restore to natural condition</p>	<p>Apply management zoning to include developed, frontcountry, motorized scenic corridor, and backcountry zones.</p> <p>Substantially upgrade the road to provide use by low-clearance vehicles.</p> <p>Within the developed zone, construct a new contact station, ranger staff residence, parking area, trailhead, comfort station, and campground. Visitors could hike about a mile to the dunes on a developed trail.</p> <p>Improve orientation and interpretation.</p>
Williams Ranch	Continue current management.	<p>Apply management zoning to include frontcountry, motorized scenic corridor, backcountry, and designated wilderness zones.</p> <p>Upgrade road design to better resist water damage, but continue to limit use to high-clearance vehicles.</p> <p>Rehabilitate the cultural landscape.</p> <p>Develop a vehicle turnaround to improve circulation at the ranch.</p>	<p>Apply management zoning to include frontcountry, motorized scenic corridor, backcountry, and designated wilderness zones.</p> <p>Manage the road and parking lot as described in alternative A.</p> <p>Stabilize the cultural landscape.</p>	<p>Apply management zoning to include frontcountry, motorized scenic corridor, backcountry, and designated wilderness zones.</p> <p>End the permit requirement for the road.</p> <p>Upgrade the road to be a single-lane, all-weather, low-clearance vehicle road.</p> <p>Rehabilitate the exterior and interior of the Williams Ranch house and use it as a museum.</p> <p>Rehabilitate the cultural landscape.</p> <p>Expand the parking lot.</p>
Other visitor facilities	Continue current management.	<p>At Ship-on-the-Desert, apply developed and motorized scenic corridor management zones. Rehabilitate the building and cultural landscape; use them to support research, education, and operation activities.</p> <p>At PX Well, apply frontcountry, motorized scenic corridor, and backcountry zones. Pursue a formal access agreement to PX Well with private landowners</p> <p>In the Guadalupe Pass area, pursue a formal access agreement with private landowners</p>	<p>At Ship-on-the-Desert, apply developed and motorized scenic corridor management zones. Preserve the building and cultural landscape.</p> <p>Assign PX Well to the backcountry zone and maintain it as a discovery site.</p> <p>In the Guadalupe Pass area, pursue a formal access agreement with private landowners</p>	<p>At Ship-on-the-Desert, apply developed and motorized scenic corridor management zones. Rehabilitate the building and cultural landscape and use them as the centerpiece for an expanded research and education program that could include cooperative partners in additional facilities.</p> <p>At PX Well, pursue a formal access agreement with private landowners. Close the Dell City visitor contact station.</p> <p>In the Guadalupe Pass area, NPS would continue to try to formalize an access agreement with landowners</p>

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Natural Resources				
Wilderness	Continue current management.	Apply management zoning to include backcountry and designated wilderness zones. Prepare a recommendation for study for formal wilderness designation for the areas that were found eligible for future consideration as wilderness. Expand education regarding wilderness importance and protection. Consider installing primitive sanitary facilities when they are needed to protect resources.	Similar to alternative A, but provide less extensive development of trailheads.	Similar to alternative A, but provide more extensive development of trailhead, additional developed trails with mapping of primitive trails, and more widely dispersed waysides and interpretive programs.  Potentially provide sanitary facilities at designated backcountry campsites.
Geological and paleontological resources	Continue current management.	Same as alternative A.	Similar to alternative A, but implement a permit system to provide access to specific stratotype and fossil locations.	Similar to alternative A, but enhance protection of specific stratotype and fossil locations by developing minimum impact visitor use education programs.
Plants and wildlife	Continue current management.	Apply some active manipulation to human-disturbed ecosystems to hasten restoration. Eradicate target invasive species of exotic plants throughout the park and implement more strict prevention measures. Use aggressive management to prevent or minimize the spread of exotics, particularly along trails used by horses. This could include an active planting program for native plant revegetation using locally collected seed. Protect wetland and aquatic environments as natural ecosystems, except when they occur as cultural landscape components. In that case they would be assessed for significance and managed accordingly. Add additional research natural areas to the system.	Manage human-disturbed ecosystems the same as the preferred alternative. In addition, restore vegetation at all sites where facilities were removed. Eradicate all species of exotic plants throughout the park and implement more strict prevention measures. Use locally collected seed in an active planting program for native plant revegetation. Prohibit horse use throughout the park. Protect wetland and aquatic environments as natural ecosystems. Improve protection of Smith Spring. Add additional research natural areas to the system.	Apply some active manipulation to human-disturbed ecosystems to hasten restoration. Accelerate recovery of previously grazed areas through reseeding with native plants. Eradicate target species of exotic plants throughout the park and use mitigation measures to protect natural communities from impacts from exotic species. Expand horse use to include overnight use on some trails in all zones, and use more aggressive monitoring and mitigation measures to control the spread of exotic plant species. Address adverse impacts to wetland and aquatic environments by mitigation. Open research natural areas to the public on a restricted basis under a permitting system.
Water quality and quantity	Continue current management.	More aggressively protect water quality and quantity. Implement a groundwater monitoring program on the west side of the park.	Same as preferred alternative.	Similar to preferred alternative, but stress providing for appropriate visitor use.

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Cultural Resources				
Archeological resources	Continue current management.	Same as alternative A except that archeological sites would be protected and stabilized.	Same as alternative A except that archeological sites would be protected and preserved.	Same as the preferred alternative.
Historic structures and landscapes	Continue current management.	Preserve national register-listed or -eligible sites while providing appropriate visitor access. Manage historic structures and landscapes as described above under "Facilities and Associated Visitor Activities." Cox and Bowl Cabins would be studied for national register eligibility and would remain discovery sites allowed to deteriorate with safety hazards mitigated	Preserve national register-listed or -eligible sites while providing minimum visitor access. Manage historic structures and landscapes as described above under "Facilities and Associated Visitor Activities." Study the Cox and Bowl Cabins as described in the preferred alternative. If not eligible for national register, remove and restore sites	Rehabilitate and potentially adaptively reuse national register-listed or -eligible sites. Manage historic structures and landscapes as described above under "Facilities and Associated Visitor Activities." Preserve Cox and Bowl Cabins and use as discovery sites.
Collections	Continue current management.	The majority of the collection would be housed off-site consistent with the servicewide Museum Collections Facility Strategy. A representative sample of the collection would be stored with the park for research, training, and interpretation within the consolidated headquarters and administrative building.	The majority of the collection would be housed off-site consistent with the servicewide Museum Collections Facility Strategy. A representative sample of the collection would be stored within the park for research, training, and interpretation in existing facilities adapted for this use.	Store a significant portion of the museum collections outside the park in a regional facility.
Visitor Use and Understanding				
Visitor experience	Continue current management.	Provide an improved understanding of the park's natural, geologic, and cultural resources through improved and expanded exhibits. Provide new camping opportunities to accommodate a wider diversity of visitors.	Provide an improved understanding of the park's natural, geologic, and cultural resources through improved and expanded exhibits. Emphasize an understanding of wilderness values and ethics in all interpretive activities.	Improve exhibits, but focus on getting larger numbers of visitors and more diverse visitors groups involved in outdoor activities through expanded facilities and improved ease of access. Provide new camping opportunities to accommodate a wider diversity of visitors.
Visitor education, interpretation, and orientation	Continue current management.	Improve opportunities by using accessible, enhanced visitor facilities, additional and improved wayside interpretive exhibits, and targeted interpretive programs and activities.	Concentrate education, interpretation, and orientation opportunities in accessible, enhanced visitor facilities.	Improve opportunities by using accessible, enhanced visitor facilities, improved and substantially expanded wayside and trail interpretive exhibits, and targeted interpretive programs and activities.



FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Interpretive and educational outreach programs and media	Continue current management.	Expand programs and media at visitor facilities and on the Internet. Expand educational outreach program to target a wider audience, including people who have not traditionally used the park.	Enhance programs and media at visitor facilities and on the Internet.	Expand programs and media at visitor facilities and on the Internet. Expand educational outreach program to target a wider audience, including people who have not traditionally used the park. Increase interaction with regional and national media.
Visitor access, circulation, and parking	Continue current management.	Expand overnight access to the park through the addition of new or expanded camping facilities. Upgrade the roads to the Salt Basin Dunes trailhead, and Williams Ranch. Provide additional parking at several sites throughout the park.	Decrease overnight access to the park through the removal of existing camping facilities. Remove the road from the park's west boundary to the Salt Basin Dunes parking area. Construct a new parking lot for the new Salt Basin Dunes trailhead	Expand overnight access to the park through the addition of new or expanded camping facilities. Upgrade the road to Williams Ranch. Upgrade the road to the Salt Basin Dunes activity area. Provide additional parking at several sites throughout the park.
Hiking trails, trailheads, and horse use	Continue current management.	Rehabilitate or realign problem segments on existing trails to reduce erosion and maintenance. Map two trails that lead from PX Well to the park's interior along former ranch routes. Manage them as primitive trails. Potentially add to the park's trail inventory by mapping hiking trails along abandoned ranch trails and road traces on the park's west side. Manage them as primitive trails in a wilderness setting. Construct a new trailhead for the Salt Basin Dunes area. Upgrade the Frijole Ranch trailhead. Continue to restrict horse use to day-use only in the designated wilderness and backcountry zones.	Rehabilitate or realign problem segments on existing trails to reduce erosion and maintenance. Potentially add to the park's trail inventory by mapping hiking trails along abandoned ranch trails and road traces on the park's west side. Manage them as primitive trails in a wilderness setting. Construct a new trailhead for the Salt Basin Dunes area. Eliminate visitor horse use and remove the public use corrals.	Rehabilitate or realign problem segments on existing trails to reduce erosion and maintenance. Add or improve hiking trails in the developed, frontcountry, and wilderness threshold zones. Develop additional trails for use by the physically challenged. Construct or upgrade hiking trails in the backcountry and designated wilderness zones to provide up to 37 miles of additional, developed trail. Manage other abandoned ranch trails and roads on the park's west side as primitive trails in a wilderness setting. Construct a new trailhead for the Salt Basin Dunes area. Upgrade the Dog Canyon trailhead. Allow overnight horse use on some trails in all zones. Expand the public use corrals at Frijole Ranch and Dog Canyon.

FEATURE	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Park Operations				
Park operations	Continue current management.	Construct a new administration facility. Provide new or upgraded sanitation facilities only where need is clearly demonstrated. Adaptively reuse Ship-on-the-Desert for research, education and operations. Enlarge the water storage system at Dog Canyon.	Adaptively reuse existing facilities. Provide new or upgraded sanitation facilities only where need is clearly demonstrated. Move NPS pack horse operations to leased sites outside the park. Enlarge the water storage system at Dog Canyon. Remove the Pine Top patrol cabin and restore the site.	Construct a new administration facility. Provide new or upgraded sanitation facilities at backcountry and designated wilderness zone campsites. Provide in other zones as needed. Adaptively reuse Ship-on-the-Desert as the centerpiece for research and education programs that could include cooperative partners in additional facilities. Enlarge the water storage system at Dog Canyon. Construct a ranger staff residence near the Salt Basin Dunes trailhead and campground. Consider a shuttle system to serve trailheads.
Boundary Adjustment				
Boundary adjustment	No-cost boundary adjustment to include two parcels of NPS-owned land.	Same as alternative A.	Same as alternative A.	Same as alternative A.

**Table 7: Summary of Impacts**

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Natural Resources				
Soils	<p>Soil disturbance from ongoing use and maintenance of park facilities would have minor, adverse, long-term impacts.</p> <p>Trail use and its related soil erosion would result in minor, long-term, adverse impacts.</p> <p>Impacts from past development would continue to be long-term, adverse, and minor.</p> <p>Regionally, cumulative impacts on soils would be moderate to major, long-term, and adverse. This alternative's contribution to these effects would be negligible.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Construction activities would result in short-term, adverse, minor impacts. Long-term, negligible to minor, adverse impacts would result from development of new facilities on about 100 acres.</p> <p>The long-term impacts of trail rehabilitation and realignment would be beneficial.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Long-term, beneficial impacts would result from restoring sites from which facilities had been removed and from trail rehabilitation and realignment. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Construction activities mostly would result in short-term, adverse, minor impacts. Long-term, minor impacts would result from development of new facilities on most of the 250 acres.</p> <p>The long-term impacts of trail rehabilitation and realignment would be beneficial.</p> <p>Because of unique soil properties, disturbances from the west boundary to Salt Basin Dunes would have moderate, long-term, adverse impacts.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>
Plant communities and vegetation	<p>Maintenance and ongoing visitor use would continue to have negligible to minor, long-term, adverse effects on vegetation.</p> <p>Continued irrigation of shade trees and lawns at the Frijole Ranch would encourage non-native species, a minor to moderate, long-term, adverse impact.</p> <p>Continued periodic dredging of Manzanita Spring to maintain the open pond would have negligible impacts.</p> <p>The proposed boundary change</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>There would be minor to moderate, adverse, short-term impacts related to construction, long-term, minor, adverse impacts from the permanent removal of about 100 acres of native vegetation from sites that would be occupied by new development, and long-term beneficial impacts from more aggressive control of invasive, exotic plants.</p> <p>Cumulative impacts would be the same as for alternative A. This</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Long-term beneficial impacts would result from restoring native vegetation on about 100 acres from which park facilities had been removed, eliminating grazing and the spread of non-native seed by horses, and aggressively controlling exotic plants.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>There would be long-term, minor, adverse impacts from permanent removal of about 250 acres of native vegetation from new development sites; minor to moderate, adverse, short-term impacts and minor, adverse, long-term impacts related to construction; and minor to moderate, long-term, adverse impacts from allowing overnight horse use throughout the park.</p> <p>Long-term beneficial impacts would</p>

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
	would have negligible impacts on vegetation, and beneficial impacts could result from arrangements that protected vegetation and plant communities outside the park. The cumulative impacts on vegetation would continue to be long-term, moderate to major, and adverse. This alternative's contribution to these effects would be very small.	alternative would contribute a very small increment to these cumulative impacts.	impacts.	result from more aggressive control of invasive, exotic plants. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.
Wildlife	Activities associated with the use and operation of the park would continue to have long-term, negligible to minor, adverse impacts on wildlife. Collisions of vehicles with wildlife would continue to have in a minor, long-term, adverse impact on wildlife. The proposed boundary change would have negligible impacts on wildlife, and beneficial impacts could result from arrangements that protected wildlife outside the park. The cumulative impacts on wildlife would be moderate to major, long-term, and adverse. This alternative's contribution to these effects would be very small.	Many impacts would be the same as alternative A. In addition: There would be minor, adverse, short-term impacts related to construction and long-term, minor, adverse impacts from the permanent removal of about 100 acres of wildlife and habitats from sites that would be occupied by new development. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Many impacts would be the same as alternative A. In addition: Long-term beneficial impacts would result from restoring wildlife habitat on about 100 acres from which park facilities had been removed. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Many impacts would be the same as alternative A. In addition: There would be minor, adverse, short-term impacts related to construction and long-term, minor, adverse impacts from the permanent removal of about 250 acres of wildlife and habitats from sites that would be occupied by new development. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.
Geological resources	Long-term, adverse impacts of negligible to minor intensity would result from continued park operation, particularly from the use and maintenance of trails. Long-term adverse impacts would continue to be negligible for caves and negligible to minor for the three areas of geologic formation reference	Many impacts would be the same as alternative A. In addition: Indirect, long-term, minor, adverse impacts would result from changes in drainage patterns on and around the approximately 100 acres that would be occupied by new development. Cumulative impacts would be the	Impacts would be the same as alternative A.	Many impacts would be the same as alternative A. In addition: There would be indirect, long-term, minor, adverse impacts on geology from changes in drainage patterns on and around the approximately 250 acres that would be occupied by new development; indirect, long-term, minor to moderate, adverse impacts

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
	<p>stratotypes.</p> <p>The proposed boundary change would have negligible impacts on geology, and beneficial impacts could result from arrangements that protected geological resources outside the park.</p> <p>The cumulative impacts on near-surface geologic resources would be long-term and adverse, and locally could be of moderate intensity. This alternative's contribution to these effects would be very small.</p>	<p>same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>		<p>from upgrading the utility infrastructure in McKittrick Canyon and Pratt Cabin; and long-term, minor to moderate, adverse impacts on sand dune formation and dune stability.</p> <p>Water crossings over McKittrick Creek would beneficially allow precipitation of natural travertine formations but could result in moderate, adverse, short- and long-term impacts during construction and floods.</p> <p>Development in the Salt Basin Dunes area could alter sand dune formation and dune stability, resulting in adverse, long-term, minor to moderate impacts.</p> <p>Visitor use education programs would have long-term, minor to moderate, adverse impacts relating to increased loss of the park's reference stratotypes and benefits from better education of visitors.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>
Paleontological resources	<p>Adverse, minor, long-term impacts on park paleontological resources would continue to occur because of hiking trail use, trail use by horses, use of caves, and access to type fossil localities.</p> <p>Indirect beneficial impacts would result from activities that exposed fossils in the park for research and</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Long-term, minor, adverse impacts would result from establishing a low-country camping area below the eastern escarpment and from improving the McKittrick Nature Trail.</p> <p>Cumulative impacts would be the same as for alternative A. This</p>	<p>The elimination of the hammering action of horseshoes on fossil deposits in trails would have a long-term, beneficial impact.</p> <p>All other impacts would be the same as alternative A.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Long-term, minor or moderate, adverse impacts would result from establishing a low-country camping area below the eastern escarpment; improving the McKittrick Nature Trail and Smith Spring Trail; constructing new trails, widening trails, and</p>

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
	<p>visitor interpretation.</p> <p>The proposed boundary change would have negligible impacts on paleontological resources, and beneficial impacts could result from arrangements that protected paleontological resources outside the park.</p> <p>The cumulative impacts on near-surface and cave paleontological resources would be long-term and adverse, and locally could be of moderate intensity. This alternative's contribution to these effects would be very small.</p>	<p>alternative would contribute a very small increment to these cumulative impacts.</p>		<p>redeveloping abandoned roads; increasing the potential for vandalism or unauthorized fossil collecting; and increasing the use of horses. Visitor use education programs would provide a beneficial impact.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>
Cultural Resources				
Archeological resources	<p>Avoidance of national register-listed or -eligible archeological resources during the construction of trail segments would result in no adverse effects. Few if any adverse effects would result from inadvertent disturbance or vandalism.</p> <p>The cumulative impacts on archeological resources would result in adverse effects. This alternative's contribution to these effects would be very small.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Adverse effects could result from the construction of new facilities on about 100 acres, site restoration, and removal of national register-eligible structures or other remnants of historic ranching activities.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Adverse effects could result from site restoration, the construction or expansion of two small parking facilities, and removal of national register-eligible structures or other remnants of historic ranching activities.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Adverse effects could result from the construction of new facilities on about 250 acres and from site restoration.</p> <p>Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.</p>
Historic structures	<p>Few if any adverse effects would be anticipated.</p> <p>Cumulative impacts on historic structures would result in adverse effects. This alternative's contribution to these effects would be very small.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Adverse effects could result from removing national register-listed or -eligible structures or allowing them to deteriorate naturally.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Adverse effects could result from removing national register-listed or -eligible structures or allowing them to deteriorate naturally.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>No adverse effects on the park's historic structures would result from any of this alternative's stabilization, preservation, or rehabilitation efforts.</p>

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
		Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.
Cultural landscapes	Implementation would result in no adverse effects on the park's cultural landscapes. Cumulative impacts on cultural landscapes would be adverse, but this alternative would not contribute to cumulative impacts.	Many impacts would be the same as alternative A. In addition: Other aspects of this alternative would result in no adverse effects on the park's cultural landscapes. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Many impacts would be the same as alternative A. In addition: Other elements of this alternative would result in no adverse effects on the park's cultural landscapes. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.	Many impacts would be the same as alternative A. In addition: Walkway improvements could have an adverse effect on the Pinery's cultural landscape. Other aspects of this alternative would result in no adverse effects on the park's cultural landscapes. Cumulative impacts would be the same as for alternative A. This alternative would contribute a very small increment to these cumulative impacts.
Ethnographic resources	Continued park-related use of the sand dunes would result in moderate, adverse, long-term impacts. Visitors using other areas of the park would have minor adverse effects on American Indians observing sacred rituals or seeking solitude to practice traditional beliefs. The alternative would have negligible impacts on visitor patterns of viewing the Our Lady of Guadalupe image. Impacts from increased park staff knowledge about indigenous plants would be beneficial and long-term. The cumulative impacts would be long-term, minor to moderate, and adverse. This alternative's contribution to these effects would be minor to moderate.	Many impacts would be the same as alternative A. In addition: Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo. Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.	Many impacts would be the same as alternative A. Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.	Many impacts would be the same as alternative A. In addition: Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo. Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
Museum collections	<p>Insufficient space in the park would result in negligible to minor, adverse, short-term impacts on museum pieces during moving and a minor to moderate, adverse, long-term impact on the ability of park staff to use offsite collections for research or study.</p> <p>The cumulative impacts on the museum collections would be long-term and beneficial. This alternative's contribution to these effects would be beneficial.</p>	<p>A beneficial, long-term impact would result from park staff access to museum collections for research, training, or interpretation.</p> <p>Other effects, including cumulative impacts, would be the same as alternative A.</p>	Impacts would be the same as for the preferred alternative.	Impacts would be the same as alternative A.
Visitor Use and Experience, Socioeconomics, and Park Operations				
Access, activities and destinations, and scenic views	<p>Alternative A would have negligible to minor, long-term, adverse impacts on visitor access and beneficial impacts for visitors desiring solitude. It would have beneficial impacts on activities and destinations and on scenic views.</p> <p>Cumulatively, actions of others would have generally adverse impacts. Implementation of alternative A would continue to be important in protecting scenic views outside the park.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Beneficial, long-term effects on access, activities and destinations, and/or scenic views would occur at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, Ship-on-the-Desert,. There could be minor, long-term, adverse impacts on visitors who desire more solitude.</p> <p>Cumulative impacts would be the same as the no action alternative.</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Minor to moderate, long-term, adverse impacts on access would result from closing the road to the Salt Basin Dunes parking area, eliminating camping except in the backcountry, and eliminating horse use. Beneficial, long-term impacts on access would be associated with providing additional parking at Williams Ranch and the new Salt Basin Dunes trailhead and from the possible addition of primitive trails to the park's inventory.</p> <p>A major, long-term, adverse impact would result from eliminating camping except in the backcountry. Eliminating horse use usually would be perceived as a major, long-term, adverse impact by riders and a negligible or beneficial impact by hikers. Increased opportunities for solitude would be a long-term,</p>	<p>Many impacts would be the same as alternative A. In addition:</p> <p>Beneficial, long-term effects on access, activities and destinations, and/or scenic views would occur at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, Ship-on-the-Desert. There could be minor, long-term, adverse impacts on visitors who desire more solitude.</p> <p>Cumulative impacts would be the same as the no action alternative.</p>



IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
			beneficial impact. Beneficial impacts on scenic views would result from removing camping from the Pine Springs area. Cumulative impacts would be the same as the no action alternative.	
Interpretation, education, and orientation	Impacts would be beneficial. Limited access to information at the Dell City contact station would have continuing minor, long-term, adverse impacts on visitors to the park's west side. The cumulative impact with other information sources would be beneficial.	Many impacts would be the same as alternative A. In addition: Additional beneficial impacts on interpretation, education, and orientation would occur. The cumulative impact with other information sources would be negligible compared to no action.	Many impacts would be the same as alternative A. In addition: Additional beneficial impacts on interpretation, education, and orientation would occur. The cumulative impact with other information sources would be negligible compared to no action.	Many impacts would be the same as alternative A. In addition: Additional beneficial impacts on interpretation, education, and orientation would occur. The cumulative impact with other information sources would be negligible compared to no action.
Socioeconomic environment	Impacts on regional economic and demographic conditions, area housing, and community infrastructure would be beneficial. Cumulative effects on regional socioeconomic conditions generally would be beneficial and this alternative's contribution to these effects would be very small.	Many impacts would be the same as alternative A. In addition: Increased visitation from park improvements would have beneficial impacts on regional economics. Long-term, beneficial impacts would result to community infrastructure. Cumulative effects generally would be beneficial but very small.	Many impacts would be the same as alternative A. In addition: Beneficial impacts on the regional economy would occur because of increased demand for commercial camping and other overnight lodging. Cumulative effects would be beneficial but very small.	Impacts would be the same as the preferred alternative.
Park operations	Insufficient administrative space that resulted in a loss of efficiencies, and the conversion of housing to office space that reduced the park's ability to meet housing needs for critical staff have resulted in long-term, moderate, adverse impacts on operations Deferred maintenance would represent a long-term, minor, adverse impact on park operations. Long-term benefits would result from use of consolidated administrative functions in a "town office" in Carlsbad and relocation of the pack animal operations to the Pine Springs	Some impacts would be the same as alternative A. In addition: Long-term, beneficial impacts would result from the new, consolidated headquarters complex near Pine Springs, the ability to reclaim two Pine Springs housing units for their original purpose, improved water storage resources at Dog Canyon, reduced maintenance of rehabilitated or realigned trail segments, and implementation of operational efficiencies. Increased maintenance associated with new or upgraded facilities would have a long-term, moderate, adverse	Some impacts would be the same as alternative A. In addition: The lack of space that would result from alternative B would have a moderate to major, long-term, adverse impacts on management and administration. Moderate, long-term, adverse impacts would occur on the maintenance aspect of operations. Cumulative impacts would be the same as in no action alternative, and this alternative's contribution would be slight.	Impacts would be similar to the preferred alternative.

IMPACT TOPIC	ALTERNATIVE A: NO ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE B	ALTERNATIVE C
	<p>area.</p> <p>The cumulative impacts would be minor, adverse, and long-term, and this alternative's contribution would be slight.</p>	<p>impact on park operations.</p> <p>Cumulative impacts would be the same as in the no action alternative and this alternative's contribution would be slight.</p>		

## CHAPTER 3: AFFECTED ENVIRONMENT





## INTRODUCTION

This chapter describes the existing environment of Guadalupe Mountains National Park. The focus is on the park resources, visitor uses and experiences, socioeconomic environment, and park operations and facilities that could be affected by implementation of the alternatives. These topics were selected based on federal laws and regulations, executive orders, NPS expertise, and concerns expressed by other agencies or members of the public during scoping for this management plan. The conditions described in this chapter establish the baseline for the evaluation of environmental consequences that is provided in Chapter 4.

The Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act require that the description of the affected environment must focus on describing the resources that might be affected by implementation of the alternatives. To enhance reader understanding, the first section in this chapter gives a broad overview of the park and its regional context. The following sections provide more detailed descriptions of the existing conditions of the park resources that could be affected by implementing one or more of the alternatives that were described in Chapter 2.



Western Escarpment

## THE PARK AND ITS REGIONAL CONTEXT

Guadalupe Mountains National Park is in a remote, sparsely populated area of the southwestern United States. The park is in Culberson and Hudspeth Counties in west Texas, adjacent to the New Mexico state line.

The closest metropolitan areas are El Paso, Texas (population about 560,000), which is about 110 miles to the west, and Carlsbad, New Mexico (population about 25,000), which is about 55 miles northeast of the park. The nearest towns include the following:

- Queen, New Mexico, which is so small that it is not recognized by the U.S. Census Bureau, is 16 miles north of the park's Dog Canyon area.
- Dell City, Texas, is a small community of about 400 people serving an irrigated agricultural area about 20 miles west of the park boundary.
- Whites City, New Mexico, (population about 50) is 38 miles east of the park.
- Van Horn, Texas, the Culberson County seat with a population of about 2,000, primarily provides ranching and tourist services. It is approximately 60 miles south of the park.

Administrative services are shared with Carlsbad Caverns National Park through an office in the city of Carlsbad, New Mexico.

Guadalupe Mountains National Park contains 86,416 acres. Most of the surrounding land is privately owned, although some land to the northwest, north, and northeast is owned by the U.S. government and managed by the U.S. Forest Service or Bureau of Land Management.

In the Dell City area, good underground aquifers allow farmers to irrigate several thousand acres and grow crops such as chilies and alfalfa. Elsewhere, the primary land use on private land outside the park is grazing. Because of the arid environment, extensive land areas are needed for grazing.

As a result, ranches are large and ranch houses are widely spaced.

The Guadalupe Mountains are internationally significant because of their outstanding geologic, scientific, and scenic resources. Spectacular scenery is a major attraction for visitors. The Guadalupe escarpment rises steeply from the desert floor and is a major landmark along U.S. Highway 62/180. El Capitan, with its sheer, thousand-foot-high cliffs, is especially impressive. Guadalupe Peak, just north of El Capitan, is the highest point in Texas (8,749 feet). There are outstanding scenic vistas from Guadalupe Peak, Hunter Peak, and other locations in the remote high country.

The park contains important cultural resources, representing periods of human use by prehistoric peoples through the 19th century settlement and ranching operations. Several sites in the park are listed in or eligible for listing in the National Register of Historic Places.

Commercial airline services are available at El Paso and Carlsbad. Highway access to the park includes the following:

- Primary access is by U.S. Highway 62/180, which runs from El Paso to Carlsbad. This highway is a high-standard, two-lane road. About 4 miles of this highway are within the park boundary near Pine Springs.
- A paved road, New Mexico Highway 137, provides access to Dog Canyon from Queen, New Mexico to the north.
- The west side of the park can be accessed via Farm-to-Market Road 1576 from Dell City. A dirt road provides access to the Salt Basin Dunes area of the park.

Historically, a road crossed the southwest corner of the park from the Williams Ranch to the old road to Dell City (the Gin Road). This 10-mile-long dirt road was only 8 to 10 feet wide and had an elevation gain of more

than 1,370 feet. This road has not been used since the 1970s and is no longer passable by vehicles, with many deep arroyos cutting through the old roadbed. At one time, Hudspeth County constructed a bladed dirt road across private land from the west to connect to the western park boundary near this old road. It also has not been maintained and remains an old road scar on the landscape.

Power and telephone lines, high-pressure gas lines, and a transcontinental fiber-optic telephone cable generally parallel U.S. Highway 62/180 on the east and south sides of the park. To the west, power and telephone lines generally are outside the park, but traverse its southwest corner.

There is active oil and gas exploration on Bureau of Land Management and state of New Mexico lands northwest of the park, and on private lands in Texas to the south and southeast. Sulfur mining is occurring about 40 miles southeast of the park in Culberson County, Texas. Potash mines in the Carlsbad, New Mexico, area are still active, but production has declined in recent years. A small gypsum mine is less than 0.5 miles west of the park boundary near Dell City. A wind farm generates electricity in the Delaware Mountains several miles south of the park.

Outside the park, visitor facilities primarily are limited to rest stops with picnic tables at scenic locations. Except in Whites City, there is only one gasoline station between El Paso and Carlsbad. Whites City has a food store, fuel, restaurants, lodging, and camping. Non-local visitors to Guadalupe Mountains National Park who do not camp in the park obtain lodging at El Paso or Carlsbad, or, to a limited extent, Whites City, Van Horn, and Dell City.

Carlsbad Caverns National Park, a nationally known destination for travelers, is about 40 miles northeast of Guadalupe Mountains National Park. Other national park units in the region that are shown in the Guadalupe Mountains National Park Region map in the

beginning of Chapter 1 include White Sands National Monument, Fort Davis National Historic Site, and Big Bend National Park.

## CLIMATE

Although the park's Chihuahuan Desert location shapes the local climate, other influences are apparent.

- The northern portions of the park in Dog Canyon are cooler and moister, reflecting a climate more like the Great Basin.
- Eastern portions of the park have Great Plains connections.
- The higher elevations can be classified as an isolated extension of the Rocky Mountains.

## Precipitation

Average annual precipitation is

- 17.72 inches in the high country, in the Bowl at 8,112 feet in elevation
- 17.40 inches on the east side of the park at Pine Springs at 5,440 feet in elevation
- 9.10 inches on the west side of the park at 3,867 feet in elevation

Winter fronts and summer convectional storms are primary sources of precipitation in the Guadalupe Mountains region. The higher elevations of the park tend to receive more winter precipitation, and the lower elevations receive more in the summer.

Winter fronts come from the west.

Precipitation is generally gentle, widespread, and often of long duration. Winter storms usually begin around the end of October, and precipitation often falls as snow, with the relative amounts increasing both with elevation and latitude.

Summer storms, in late afternoon or evening rainfall, are fast moving, of short duration, and accompanied by high winds, thunder, and lightning. Rainfall from these cells is generally localized and heavy once the pattern sets up, with the initial development often bringing only dry lightning with virga



(rainfall that evaporates before reaching the ground). Heavy downpours over sparsely vegetated desert uplands often cause flash flooding in downgradient canyons. These storms usually begin early in July, and the pattern persists until the end of September, when the interior of the southwest begins to cool down. The lightning associated with summer thunderstorms is the primary cause of natural fires that occur in the park.

### **Temperatures**

The average daily maximum for the warmest month (June) in the Pine Springs area at the eastern base of the mountain (5,500 feet above mean sea level) is about 88 degrees Fahrenheit, and temperatures above 90 degrees Fahrenheit are common. The average monthly temperature at Pine Springs for the coldest month (January) is 42 degrees Fahrenheit, and lows in the 20s are common. On average, the high country at an elevation greater than 8,000 feet above mean sea level is about 10 degrees Fahrenheit cooler than the Pine Springs area, and the western side of the park, at an elevation of about 3,600 feet above mean sea level, is about 10 degrees warmer.

### **Winds**

The Guadalupe Mountains, and especially Guadalupe Pass, are noted for high winds. The prevailing air movement is from the

west and southwest. Local topography channels the wind into southwest-northeast directions, with southwest being the predominant direction. Strong winds often exceed 60 to 80 miles per hour, and can occur in excess of 100 miles per hour with the passage of cold fronts throughout the seasons from winter to early summer.

Topographic heating and cooling creates daytime upslope flow and nighttime downslope flow of air. By themselves, the thermal-related winds would not reach destructive velocities, but they may add 10 or 20 miles per hour to the velocity of wind from another source. This compounding effect makes the Guadalupe one of the windiest places in the nation.

## **PHYSIOGRAPHY**

Physiographically, the Guadalupe Mountains are characterized as part of the Sacramento Section of the Basin and Range Province (Fenneman 1931).

The lower elevations of Guadalupe Mountains National Park consist of mostly sparsely vegetated Chihuahuan Desert and rolling foothills. Within this setting, the uplifted Permian reef forms a huge, V-shaped escarpment. The uplift creates a “sky island” in the midst of the desert, in which rests the Bowl, an area of relict forests that provide mostly mixed conifer habitat.





**Aerial View of the Guadalupe Mountains**

El Capitan, on the southern end of the escarpment, is a prominent park landmark that is visible for more than 90 miles. The impressive escarpment extends northwest from El Capitan and contains other distinctive peaks, including the 8,749-foot-high Guadalupe Peak, the highest point in Texas. The next three highest peaks in Texas, all of which exceed 8,000 feet above sea level, also are in the park. The base of the western escarpment is 3,650 feet in elevation, some 5,100 feet lower than Guadalupe Peak.

The uplift of the Guadalupe Mountains probably occurred in Miocene times, resulting in a fault-block mountain mass that tilts slightly to the northeast and has as its westerly margin the sheer fault-scarp. Principal drainage of the mountain mass has been to the east, and has created deeply incised canyons where relict biota survive. To the west, the sheer, slightly dissected fault scarp forms the eastern boundary of a bolson, or valley having no outlet. The

internal runoff from this area collects in a great, shallow, evaporation basin known as the Salt Flats.

The high country's major scenic and scientific features are not visible from the desert floor. The high country's features include the following:

- A distinctive area of relict forest includes ponderosa pine, southwestern white pine, Douglas-fir, and a small grove of aspen.
- The Bowl, which is in the center of the 45,000-acre high country forest, provides mixed-conifer habitat.
- McKittrick Canyon extends out of the high country and through the eastern escarpment. Its south arm possesses special scenic appeal and scientific importance because of its unique geology and biotic communities.

## HYDROLOGY

Most of the water sources of the Guadalupe Mountains originate in the upper mountainous regions and appear as springs and seeps at the base of the escarpment. Springs and tributaries between mountain peaks and ridges are few.

Cuts created through the rock layers by flowing water allow groundwater to drain into the canyons. Depending on rainfall, there can be numerous springs and seeps. However, most streams are intermittent because of the permeability of the strata. Only nine permanent springs have been identified within Guadalupe Mountains National Park.

The park includes two perennial streams: Choza and McKittrick. Choza is a spring-fed stream that runs along the surface for 1.0 to 1.5 miles. McKittrick Creek is a unique aquatic ecosystem. It is a small, discontinuous, spring-fed stream that runs for 7.7 miles in McKittrick Canyon. The principal direction of flow is easterly, cutting through the Permian limestone of the Guadalupe escarpment where the surface flow ends. Travertine deposits seal the bed and keep flow on the surface for much of the length of the canyon.

## ZOOGEOGRAPHY

Biologically, the Guadalupe Mountains are an “island” in the Chihuahuan Desert. In a sense, the Guadalupe range is a connecting link between the Rocky Mountains, the Chihuahuan Desert of Mexico, the grasslands of the Great Plains, and the deciduous woodlands of the east. Dozens of plants and animals from all of these diverse habitats mingle here, many at the geographic limits of their range, isolated from other populations of their species by an expanse of desert.

The Guadalupe Mountains environment resulted from a gradual climatologic shift from a cool, moist climate during the late Pleistocene toward drier and warmer

conditions. The highest portion of the Guadalupe Mountains range in the park provides a last refuge for many of the park’s relict species of plants and animals.

The geologic events that resulted in the uplift of the ancient reef formation created a series of distinct climate zones and associated ecological communities that extend from the basin floor to the mountaintops. Climates at the lowest elevations are similar to those of northern Mexico, with cactuses and drought-resistant shrubs. At the highest elevations, the climate is similar to that in southern Canada, with areas that exhibit decidedly alpine characteristics. This wide range of environments has resulted in a wide diversity of plant and animal life.

In many Guadalupe Mountain communities, the plant overstory plays a critical role in shielding the surface microhabitats from the sun’s heat and retaining soil moisture and humidity. In particular, important overstory layers are found in the bottoms of the deeply incised drainages in the eastern parts of the park, including McKittrick, Pine Springs, and Dog Canyons.

## CLIMATE CHANGE AND ITS INFLUENCE ON THE PARK ENVIRONMENT

Climate change is expected to modify the arid southwest of the United States, including the Guadalupe Mountains National Park vicinity. Precipitation and flooding events are projected to become more extreme, even as drought conditions intensify. Observed and projected climate changes will likely

- alter plant species ranges
- shift the geographic and elevational boundaries of the Chihuahuan desert
- change vegetation cover and composition
- increase rates of erosion and sediment transport to streams

- increase tree mortality from synergistic associations between drought stress and insect outbreaks
- increase the frequency, size, and duration of wildfires
- increase the probability of extinctions in plant and animal species

Most climate models show that arid regions will become drier and that the transition to a more arid climate is already underway.

Western Texas has been identified as a climate change “hot spot” that is predicted to be especially sensitive to human-caused climate change. (Diffenbaugh *et al.* 2008) Based on projections made by the Intergovernmental Panel on Climate Change and results from the United Kingdom Hadley Centre’s climate model (HADCM2), temperatures in Texas by the year 2100 could increase by about 3 degrees Fahrenheit in spring and about 4 degrees in other seasons. Precipitation is estimated to decrease by 5% to 30% in winter and increase by 10% in the other seasons. Increases in summer could be slightly higher (up to 30%) than in spring and fall. Other climate models may show different results. The amount of precipitation on extreme wet days in winter is likely to decrease, and the amount of precipitation on extreme wet days in summer is likely to increase. The frequency of extreme hot days in summer would increase because of the general warming trend (U.S. Environmental Protection Agency 1997).

Changes in streamflow tend to magnify changes in precipitation. Water resources in drier climates tend to be more sensitive to

climate changes. Because evaporation is likely to increase with a warmer climate, it could result in lower river flow, particularly in the summer. If streamflow drops, groundwater recharge could be reduced. In addition more intense precipitation could increase flooding (U.S. Environmental Protection Agency 1997). Increased severity of flood events could cause a change in surface water flow and the availability of water to wildlife and vegetation in Guadalupe Mountains National Park.

In forests, climate change could weaken and stress trees, making them more susceptible to pine bark beetle outbreaks. Warmer, drier conditions could reduce the percent cover in semi-arid grasslands and shrublands, resulting in a more desert-like pattern of vegetation (U.S. Environmental Protection Agency 1997).

The purpose of this chapter is to describe the resource conditions of the park to better understand the effects of the alternatives. For each resource topic, this chapter includes a description of past, present, and future trends in resource conditions. Because climate change is an important factor that could influence future resource conditions, it is included as part of the description of the affected environment of the park.

The potential influences of climate change are described under the vegetation, wildlife, and visitor experience resource topics. These are the resources that the planning team considers to be at the greatest risk from the impacts of climate change.

## NATURAL RESOURCES

### OVERVIEW

Natural resources of the park were identified in a geographical information system and were compiled to create the Natural Resource Distribution Analysis map. The park's soils, plant communities and vegetation, wildlife, geologic resources, and paleontological resources are likely to be influenced by actions by park managers and visitors. The current condition of each of these resources is described in this section.

### SOILS

Soils differ considerably as a function of elevation and aspect in the Guadalupe Mountains. In general, soils are very thin to absent, calcareous, and of poor quality. The shallow soils tend to be held in place by rock cover, which also defends against erosion and keeps moisture from escaping. All soils in the park are highly susceptible to loss by wind and water erosion after they have been disturbed or exposed.

As elevation increases, more leaching of calcium carbonate is evident. Soils at higher elevations also become more clay based, exhibit evidence of clay translocation, contain more organic carbon, and become drier.

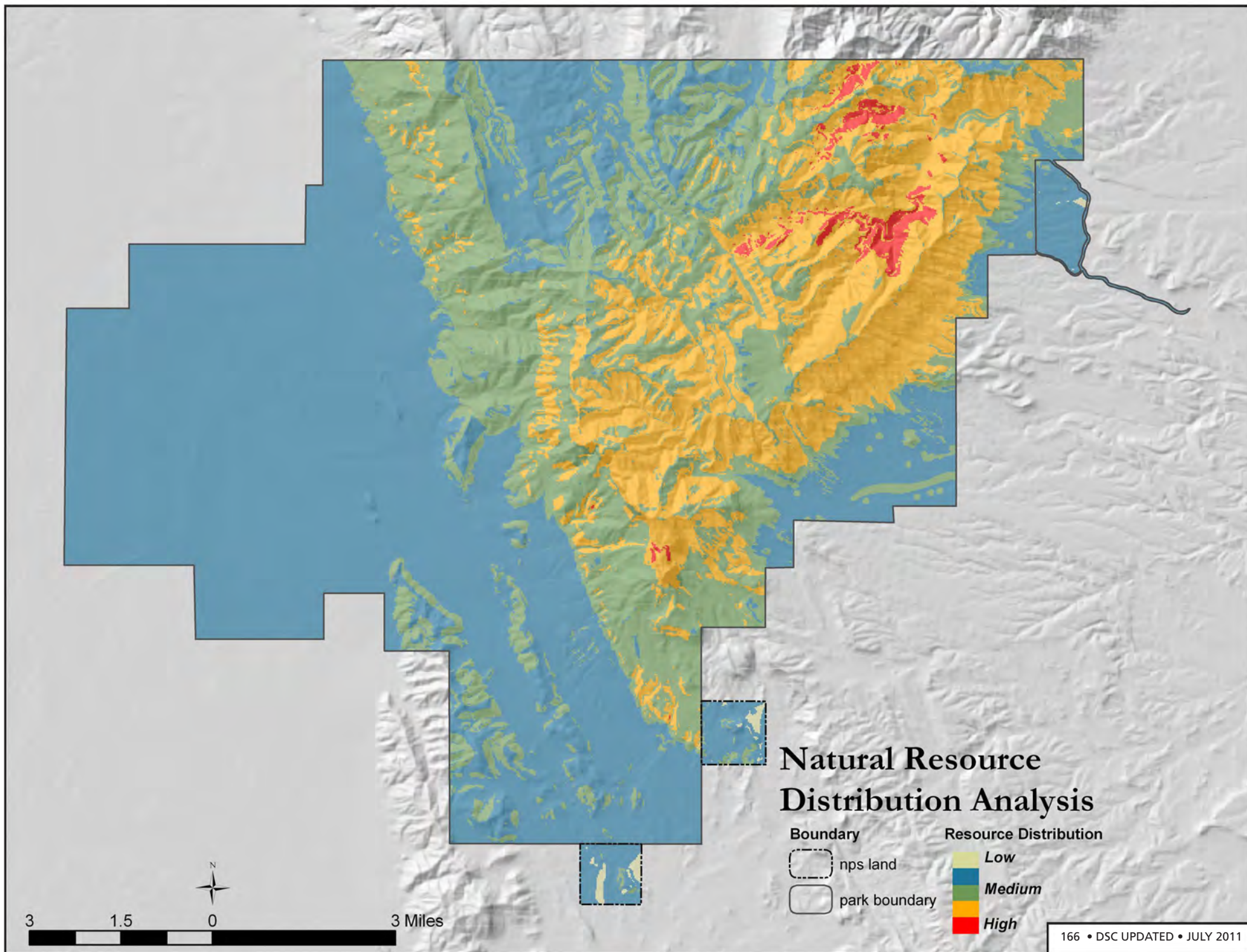
Flooding is regular in canyons, with deposition and cutting occurring as normal events. The many deep, dry arroyos reflect the significance of floods.

Thicker soils in the Salt Basin are highly alkaline (gypsiferous), and can support only a few, highly adapted plants. Cryptobiotic soils are common in the alkaline

environment where gypsum sand dunes have become stabilized.

Cryptobiotic soils are living soil crusts that are dominated by cyanobacteria (formerly called blue-green algae), but that also include lichens, mosses, green algae, microfungi, and bacteria. These crusts play an important role in natural ecosystems. These bacteria also are important because of their ability to convert atmospheric nitrogen to a form that plants can use, and their capacity to intercept and store water. Both characteristics are especially important in desert ecosystems (like the Guadalupe region) where nitrogen levels are low and water is scarce.

Many human activities are incompatible with the presence and well-being of cryptobiotic soils. The "fibers" that give the crusts their strength are crushed by footprints or machinery. Vehicle or bicycle tracks are especially damaging, creating areas that are vulnerable to wind and water erosion, and rainfall carries away loose material, often creating channels along these tracks. Wind also blows pieces of the pulverized crust away, transporting the underlying loose soil, and often covering the nearby crusts. Burial can mean death because crustal organisms need light to photosynthesize. When crusts overlying large sandy areas are physically disturbed during dry periods, previously stable areas can become a series of shifting sand dunes in just a few years. Under ideal circumstances, a thin veneer of cryptobiotic soils may return in five to seven years, but in some disturbed areas, damage to the sheath material and the accompanying loss of soil nutrients result in a recovery period of 50 years or more.



## PLANT COMMUNITIES AND VEGETATION

The park is in a vegetative transition zone where east meets west, and some plants found in the Rocky Mountains are at their southernmost geographic limits. The mountains form a biological “island” that is surrounded by the northern Chihuahuan Desert and provides diverse plant communities. More than 1,000 species of plants have been recorded in the park, including 37 plant species of special concern. Of these, 16 are endemic to the Guadalupe Mountains.

Depending on the elevation and exposure, vegetation types in Guadalupe Mountains National Park include desertscrub, grasslands, chaparral, woodlands, and coniferous forest. Striking desert succulents, canyon fall color, and high-country conifers are all part of the park’s appeal. The fall displays of western hophornbeam and bigtooth maple are particularly attractive. The only known Texas populations of this species of hophornbeam are common in park riparian woodland areas above 6,000 feet, with some also occurring at somewhat lower elevations in McKittrick Canyon.

Endemic plants are a special feature of Guadalupe Mountains National Park. Unique taxa occur in nooks on limestone cliffs and ledges, in high-elevation forested canyon bottoms, and along streams at lower elevation (Northington and Burgess 1979). The McKittrick pennyroyal, Guadalupe Mountain violet, McKittrick snowberry, and Guadalupe rabbitbrush, are examples of plants found nowhere else but the Guadalupe, as indicated by their names.

Within the park, seven vegetation types have been identified that correspond with the Brown-Lowe-Pase biomes as described for the biotic communities of the Southwest (Brown 1994). These include:

- Rocky Mountain (Petran) conifer forest
- Great Basin conifer woodland
- Madrean evergreen woodland
- interior chaparral
- [Chihuahuan] semidesert grassland
- Chihuahuan Desertscrub
- interior riparian / deciduous forest

In addition, a distinctive assemblage of plants has developed on and around the gypsum dunes.

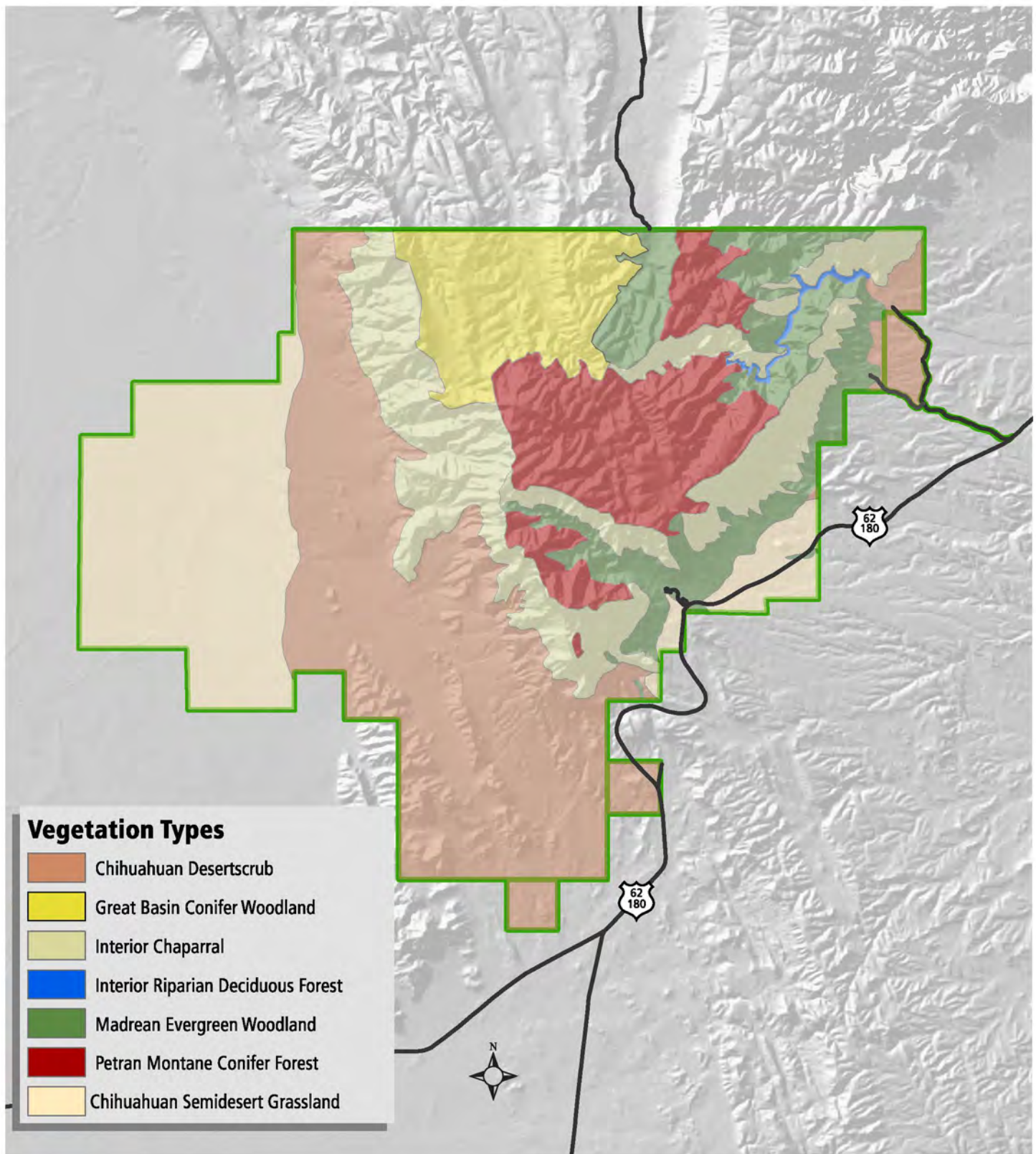
The characteristics of the major biotic communities in the park are summarized below. The Vegetation Types map illustrates the distribution of these plant communities within and outside the park boundaries.

### Rocky Mountain (Petran) Conifer Forest

The high country of the park, from 7,000 feet to 8,749 feet in elevation, contains a Rocky Mountain coniferous forest, which is some of the southernmost extent of this Rocky-Mountain-derived forest in the Chihuahuan Desert region in the United States. The closest occurrence of this vegetation type is about 70 miles to the northwest in the Sacramento Mountains. Douglas-fir, southwestern white pine, and ponderosa pine are dominant trees. The larger trees include firs with diameters of nearly 40 inches and ponderosa pines up to 32 inches in diameter. The only broadleaf deciduous trees of significance are Gambel oak (including one individual 32 inches in diameter, an unusually large size) and southwestern chokecherry (10 inches in diameter). A relict, isolated stand of quaking aspen persists in this zone.

Southwestern white pine and Douglas-fir dominate north-facing slopes with ponderosa pine and pinyon included in the mix. The drier, south-facing slopes support a ponderosa pine forest mixed with pinyon pines and alligator juniper.





### Vegetation Types

- Chihuahuan Desertscrub
- Great Basin Conifer Woodland
- Interior Chaparral
- Interior Riparian Deciduous Forest
- Madrean Evergreen Woodland
- Petran Montane Conifer Forest
- Chihuahuan Semidesert Grassland

0 1 2 4 6 8 Miles

## Vegetation Types

Guadalupe Mountains National Park  
United States Department of the Interior / National Park Service  
166 • 20 • 046 • IMRO • JULY 2011

Botanically, the inventory of trees, shrubs, flowering plants, and grasses is quite impressive and includes plants known nowhere outside the park. Many of the park endemics, such as the McKittrick pennyroyal, once listed as a threatened species, are found in limestone outcrops in the high country. The microflora and lower plants, such as ferns and mosses, have received little systematic study.

The high country gradually descends toward the northwest and includes the rugged topography of Lost Peak, Upper Dog and West Dog Canyons, and PX Flat. In these areas, the vegetation composition changes to a pinyon -juniper forest woodland.

The Bowl contains a relict pocket of true coniferous forest and is a popular hiking destination where visitors can experience this forested sky island in the Chihuahuan Desert. The topography of the area suggests the name, the Bowl, and provides outstanding habitat for species such as elk, mountain lion, black bear, wild turkey, and Montezuma quail. In the Bowl, desert plants such as agaves can be seen beside towering Douglas-fir and pines. In late summer, fields of nodding onion and other wildflowers such as Indian paintbrush and wallflowers bloom under the forest canopy.

### **Great Basin Conifer Woodland**

Great Basin conifer woodlands, also known as pinyon-juniper woodlands, can be found in the northern canyons of the park and on dry or west-facing slopes, commonly between 5,000 feet and 7,000 feet elevation. Overstory constituents include pinyon pine, one-seed juniper, alligator juniper, Rocky Mountain juniper, and grey oak. Pinyon-juniper woodlands occupy areas characterized by intense sunlight, hot summers, relatively low precipitation, and high evapotranspiration. This woodland shifts between being woodier or grassier, depending on aspect, moisture conditions, grazing, fire frequency, and competition. Along their lower margins, pinyon-juniper

woodlands mix with mountain grasslands and shrublands. At the upper limits, they can reach the forests of ponderosa pine.

### **Madrean Evergreen Woodland**

Oaks dominate this woodland type that is found scattered throughout the park, mostly on shady canyon slopes. Beautiful Texas madrone trees are found in this vegetative type and add to the park's charm, along with New Mexico agave, alligator juniper, sumacs, and penstemons.

### **Interior Chaparral**

The drier, south-facing slopes of the park's many deep canyons are covered with species such as mountain mahogany, ceanothus, sotols, sandpaper bush, and other shrubs that make up the interior chaparral community. This dense vegetation is important habitat for wildlife and for watershed protection.

### **Chihuahuan Semidesert Grassland**

The Chihuahuan Desert once encompassed extensive grasslands, but only small remnants remain today. Stands of black grama, blue grama, muhlenbergias, and stipas (needlegrass) are still present in the park. With the cessation of livestock grazing, these grasslands are recovering and expanding. When moisture conditions are right, these grasslands can explode with color from the blooms of coneflowers, globe mallow, evening primroses, phlox, and other species.

### **Chihuahuan Desertscrub**

Chihuahuan Desertscrub or shrub occupies the lowlands of the park. Stands of widely spaced, small-leaved shrubs are scattered across bajadas, flats, and dunes. Dominant shrubs such as catclaw acacia, allthorn, ratany, apache plume, and littleleaf sumac have tiny leaves to conserve water (microphyllous), grow slowly, and are widely spaced on flats and gravelly hills at the base of the south- and east-facing slopes and the west escarpment. Common



succulent species that can withstand desert conditions include lechuguilla, New Mexico agave, torrey yucca, ocotillo, and several species of prickly pear, cholla, hedgehog, and pincushion cactus.

Areas of Chihuahuan Desertscrub may have been grassier before grazing. Today, many are dominated by creosote bush, which is the most characteristic plant of North America's hot deserts. It competes aggressively with other plants for water, and usually wins, accounting for its prevalence in many arid locations of the southwest.

### **Interior Riparian / Deciduous Forest**

Deciduous trees grow primarily at springs and in streambeds at low elevations but become the dominant growth form on stream terraces and in the canyon heads above about 4,921 feet (1,500 m). Deciduous trees dominate north-facing slopes at this elevation and are joined by conifers on drier sites. Little walnut and velvet ash occur at the mouths of canyons, but as the stream elevation increases, western hophornbeam, bigtooth maple, and chinquapin oak come into the mix, especially on stream terraces, around springs, and in canyon heads.

McKittrick Canyon is the key representative of the hardwood / riparian forest and woodland in the park. The canyon is a popular attraction during autumn when the maples, oaks, and other deciduous trees bring vibrant colors to the canyon. Texas madrones are common in the canyon bottom. Penstemons, orchids, and columbines, along with ferns, sawgrass, and sedges, can be found in the canyon floor, as well as cacti, century plants, sotols, and towering yuccas. Species of interest include the possibly extirpated Guadalupe fescue and the Chapline's columbine.

### **Gypsum Dunes Flora**

The gypsum dunes are found within the Chihuahuan semidesert grassland. The dunes' shifting sands and arid climate give rise to an ecologically unique area. Unusual

botanical assemblages and hardy wildlife species endure the harsh conditions. These biological communities of the white sand dunes are an important and rare part of Texas' natural heritage.

Plants that survive on the dunes are adapted to strenuous conditions, such as high soil salinities, a mobile substrate, and large temperature fluctuations. Several unusual botanical species and communities are found on and around the dunes. About 40 plant species occur in association with the dune fields, and about 15 of these species are found in the heart of the dunes. Many of these plants are endemic. Among the most significant are the sand bluestem, broom pea, rosemary mint, soap tree yucca, and gyp grama. Rare species include Indian rice grass, gyp moonpod, shy mentzelia, and the pink plains penstemon. Botanical diversity increases where the dune fields meet the surrounding grasslands and the less-saline quartzose sand areas. False buffalograss and sixweeks grama are among the roughly 30 species that occupy these transitional zones. Gypsum scalebroom is an endemic species of interest and concern.

### **Climate Change Effects on Vegetation**

Climate change will likely affect the vegetation communities and wildlife habitat of the park because of the projected increases in annual temperature, changes in precipitation patterns, and increases in severity of storm events. However, the rate and magnitude of these changes and the impact on specific populations of plants and wildlife habitat will vary widely, based on localized features such as elevation and slope aspect.

Arid ecosystems are particularly sensitive to climate change and climate variability because organisms in these regions live near their physiological limits of water and temperature stress. Slight changes in temperature and precipitation regimes, or in the magnitude and frequency of extreme climatic events, can substantially alter

composition, abundance, and distribution of species.

Some plant species currently present in Guadalupe Mountains National Park may not be able to adapt to these changes. Warming temperatures and changing rainfall patterns could alter the composition of native plant communities by creating conditions that are more favorable to insects and disease. Climate changes also could increase the competitive advantage of non-native or invasive species.

These changes could be particularly pronounced because the park is a sky island. Four plant species that are endemic to the park and live in shady clefts or high-elevation pockets may not be able to adapt to climate change and could be at risk. These include the Mat least daisy (*Chaetopappa hersheyi*), cardinal penstemon (*Penstemon cardinalis regalis*), Guadalupe Mountains violet (*Viola guadalupensis*), and rock crevice milkwort (*Polygala rimulicola*). Changes in habitat associated with a warmer and dryer climate could result in the extirpation of these species within the park.

## WILDLIFE

From the Chihuahuan Desert to the conifer forest, the Guadalupe Mountains' diverse ecosystems are home to more than 60 species of mammals (Cornely 1991), 303 species of birds (including 94 breeding birds) (Newman 1997), and 55 species of reptiles and amphibians (Grace 1980 revised by Wauer 1991). The park represents a transition or overlap zone with species of birds, mammals, and reptiles present but separated from their normal range.

The park's springs and streams, including Upper Pine, Frijole, Smith, Manzanita, Choza, Guadalupe, and Bone Springs and McKittrick Creek, are important wildlife sustaining and viewing areas. In addition, the numerous intermittent springs and seeps in the park are essential for supporting wildlife. Reliable water in these places and in

McKittrick Canyon attracts mule deer, mountain lion, bobcat, ringtail, gray fox, and black bear.

## Mammals

Some mammals, such as bobcat, mountain lion, coyote, and black bear, are reclusive, while mule deer are very common and obvious. Besides deer, people most often see cottontail, jackrabbit, and rock squirrel. Occasionally a gray fox or javelina (peccary) can be seen. The native Merriam's elk was extirpated around the turn of the 19th century. A herd of Rocky Mountain elk was reintroduced in the 1940s and 1950s and is currently estimated to include about 30 animals. Also present is the shy ringtail cat, a relative to the raccoon. At night, hognose skunks and bats can be seen.

Some mammals that once were present in the park are gone (extirpated). Most notably these include the pronghorn, black-tailed prairie dog, and bighorn sheep, all of which are found in suitable habitat southwest of the park. Exotics that are not native to the park, such as the aoudad, have been introduced and are present today.

At night, both large and small mammals venture onto the Salt Basin Dunes to search for food. The desert plants support a large population of kangaroo rats and pocket mice. Desert cottontails and black-tailed jackrabbits are common vertebrates. Foxes, coyotes, and snakes emerge from their dens to feed on these rodents. It is rare to see these animals, but the multitude of tracks traversing the dunes during the day reveal the struggle for survival that occurs at night.

Species of interest and special concern include the Guadalupe southern pocket gopher and Mogollon vole. Numerous bats, some rare, frequent the area, with some ranging from Carlsbad Caverns more than 30 miles away to feed in the park.

## Birds

More than 300 species use the park, including 94 species that are known to breed

in the park. The highest activity is early in the morning, just before sunrise. Good spots for bird watching are along the Devils Hall and Smith Springs Trails, at Frijole Ranch, and in Guadalupe and McKittrick Canyons.

- The most often observed birds of prey are hawks, but eagles, owls, and falcons can also be seen.
- The desert lowlands are home to the verdin, roadrunner, cactus wren, and several species of sparrows, to name a few.



American Kestrel

- Bird species commonly seen at moderate elevations in the park include the canyon towhee, rufous-crowned sparrow, juniper titmouse, western scrub jay, and scaled quail. In summer, Scott's oriole, Say's phoebe, white-throated swift, and turkey vulture are common.
- The high country forests of Douglas-fir and southwestern white and ponderosa pine provide habitat for birds such as the mountain chickadee, Steller's jay, red-breasted nuthatch, pygmy nuthatch, red crossbill, and hairy woodpecker.
- Birdwatchers who come to the park hope to see rare magnificent and blue-throated hummingbirds and Montezuma quail.

The park is home to one threatened and endangered species, the Mexican spotted owl, and several species of concern, including the peregrine falcons, yellow-billed cuckoo, and burrowing owl.

Guadalupe Mountains National Park has been identified as an Important Bird Area by Partners-In-Flight.

### Reptiles and Amphibians

The park is home to nine species of amphibians and 45 species of reptiles. Several kinds of lizards are commonly seen along trails and on rocks, including collared lizards, Chihuahuan spotted whiptails, prairie lizards, skinks, and Texas horned lizards. Snakes are also common in the Guadalupe, including five species of rattlesnakes; the western diamondback and black-tailed rattlesnake are the most abundant. These snakes prey on small rodents and lizards and are important members of the natural community. Other reptiles in the park include mud and box turtles.

Several reptile species inhabit the Salt Basin Dunes area, including side-blotched lizards, long-nosed leopard lizards, western whiptail lizards, western diamondback rattlesnakes, and prairie rattlesnakes. The site's rarest animal resident is a white variety of the lesser earless lizard. This species is known to occur at only one other site in the world, the dunes of White Sands National Monument.

The Rio Grande leopard frog, western box turtle, Texas banded gecko, crevice spiny lizard, roundtail horned lizard, mountain shorthorned lizard, Trans-Pecos rat snake, gray-banded kingsnake, western hooknose snake, and rock rattlesnake are amphibians and reptiles of particular interest. Possible species of interest that are suspected to be present but have not been documented include the barking frog, smooth green snake, and desert massasauga (Grace 1980 revised by Wauer 1991).

### Invertebrates

Many spiders are found in the park, including the large but harmless tarantula. Millipedes and centipedes are most commonly observed in the desert areas, together with several kinds of scorpions.

Grasshoppers are among the most conspicuous insects, and a dozen species may be found, including lubber grasshoppers. They often are fed on by the praying mantis. Ants, wasps, and bees are also part of the ecosystem.

In the higher elevations at certain times of the year, masses of ladybugs can be seen as they migrate. Beetles are abundant and often colorful. The Texas minute moss beetle and Guadalupe Mountains tiger beetle are species of special interest and concern.

Many butterflies fill the air in the canyons, often including yellow tiger swallowtails. A survey of butterflies and moths inventoried more than 1,250 species in the park, and at least 90 taxa of aquatic invertebrates have been found in McKittrick Canyon.

The wildlife of the Salt Basin Dunes is composed primarily of invertebrate species that are able to survive the desert conditions of the dune fields. Sand-treader camel crickets are common, along with various species of ants, flies, and beetles.

Light infestations of Douglas-fir beetle, budworm, and western pine beetle are present in the park, especially at higher elevations, where populations cyclically wax and wane.

### Climate Change Effects on Wildlife

Effects of climate change on wildlife habitat was included in the climate change discussion under “Plant Communities and Vegetation.” As described, impacts on specific populations of wildlife will vary based on localized features such as elevation and slope aspect, and on the competitive advantage that climate change gives to

insects, diseases, and non-native or invasive species.

A wildlife species that could be impacted is the lesser earless lizard (*Holbrookia maculata*), which is a light-colored variant found only on the gypsum dunes. If the stabilizing factor of high moisture content in the dunes is altered by climate change, the dunes could blow away and leave this lizard without habitat.

## GEOLOGIC RESOURCES

### General

The Guadalupe Mountains are one of the finest examples of an ancient fossil reef on Earth. Geologists from around the world come to the park to study this extraordinary natural phenomenon.

Between 260 and 290 million years ago, during the Permian Period of geologic time, a large, tropical sea containing various life forms covered portions of Texas and New Mexico. Over millions of years, calcareous sponges, algae, and other lime-secreting organisms combined with vast quantities of lime precipitated directly from seawater to form the 400-mile long, horseshoe-shaped Capitan Reef. Eventually the sea evaporated, and a thick blanket of sediments and mineral salts filled the basin and buried the reef. The reef was entombed for hundreds of millions of years until about 20 to 30 million years ago, when uplift from major regional faulting exposed a part of the fossil reef and formed the Guadalupe Mountains.

Major outcrops of reef deposits occur in McKittrick Canyon and the classic geologic exposures along the western escarpment.

The extensive exposures of the Permian reef are considered by geologists and paleontologists throughout the world as an outdoor laboratory of unique importance for investigating scientific principles; tracing the history of the earth; and understanding the origins of certain valuable mineral resources such as petroleum, potash,

dolomite, and limestone. The reef rocks and adjacent permeable deposits form the main body of the Capitan Reef aquifer, which supplies water across a large area from Carlsbad, New Mexico to the Midland-Odessa area of Texas.

### Geology of the Western Escarpment

The park's western escarpment has played an important role in revealing the story of the Permian Period in North America. These exposures are almost a mile thick and present one of the finest cross-sections of rocks in the world, showing complete lateral transitions from shallow-water marine deposits to deep-water marine deposits. Specifically, the abrupt changes in rock types reflect sediment deposition in shallowly

submerged areas, on wave-built shoals, on the crest of the barrier reef, down the reef face, and in the cold, dark waters of the deep sea basin.

Geologists have intensively studied exposures on the lower section of the western escarpment, and numerous stratigraphic *type sections* are designated in this area. A *type section* serves as the defining unit to which all other rocks of similar age and composition can be compared. These exposures are carefully managed for preservation so that geologists can continue to study and learn about this ancient fossil reef and to provide continued enjoyment by the general public.

### Geologic Time

*The geologic time scale is broken into several intervals, the name for each generally describing the types of fossils found in rocks deposited during that time interval. The longest time intervals are divided into eons.*

*The earliest or oldest eon on Earth is called the Hadean Eon, suggesting conditions during the fiery formation of the primordial Earth as being too hot for life to be possible.*

*The next oldest interval is the Archean Eon, meaning "beginning" which suggests that life first became possible during that time.*

*The next, younger division is known as the Proterozoic Eon. This name is a combination of two Greek words – protero, meaning "former" and zoe, meaning "life," referring to the simple and primitive condition of organisms that lived during that time.*

*The latest, or youngest eon in geologic time is the Phanerozoic Eon. Phanerozoic means "abundant life."*

*These long eons can be broken into smaller parts called eras. For instance, the Phanerozoic is divided into the Paleozoic Era (old life), Mesozoic Era (middle*

*life), and Cenozoic Era (familiar life). These are based on the idea that the farther back in time one looks, the less familiar life forms will be. For instance, the Cenozoic is also called the "Age of Mammals," because there are abundant fossils of many different kinds of mammals in these rocks. The Mesozoic Era is the "Age of Dinosaurs." The fossils of the Paleozoic Era are mostly invertebrate animals with shells instead of backbones, although simple fish, early amphibians, and primitive reptiles are found.*

*Eras can be broken down into still smaller parts called periods. Periods are most often named for an area or region where those rocks were first studied. Examples are the Cambrian Period named for an area on the western Scottish Borderlands in northern England, or the Devonian Period named for Devonshire in southeastern England, or the Permian Period named for a region in Russia.*

*Periods are divided into smaller parts called series, which are also based on geographic areas. The latest division of the Paleozoic Era, the Permian Period, was only recently divided into three series. The oldest is the Cisuralian Series from the Ural Mountains in Russia. The youngest is the Lopingian Series from an area in China, but the one in between, the middle Permian, is the Guadalupian Series, named for the Guadalupe Mountains!*

## Stratotypes

Three localities in the park were recently designated as *global stratotype sections*. Global stratotype sections are *type sections* of international significance and are designated for having the world's best geological and paleontological record of any rock of its age.

The park's three global stratotype sections are formal international reference standards for the middle Permian Period of the geologic time scale. The middle Permian Period is now known worldwide as the Guadalupian Series and is named for the Guadalupe Mountains. This time interval is based on the presence of certain evolutionary transitions of fossil conodonts (microscopic teeth of an extinct marine vertebrate).

### ***What Is a Reference Stratotype?***

*A stratotype is an especially fine outcrop (section) of rocks that represents a certain portion of geologic time. A global stratotype section is considered to be the world's best preserved and most complete rock outcrop representing its particular interval of geologic time. To be named a global stratotype section, an outcrop must have been studied extensively, must contain a wealth of fossils from a wide range of environments, and must not have been strongly deformed or heated by Earth processes. It must also be officially approved by a special committee of international geologists and be accessible to international researchers. Researchers maintain worldwide consistency in geologic time by comparing any fossils of a similar age back to those of the global stratotype section.*

## Gypsum Dunes

The white sands of the gypsum dunes rise up to 100 feet from the desert floor and provide a brilliant contrast to the dark, towering rock face of the Guadalupe Mountains. To the west are barren salt flats that are responsible for creating these beautiful dunes. As rainwater runs off the highly soluble limestone rocks that surround the area, salts

are leached. When this runoff accumulates on the flats of the desert basin and evaporates, large grains of these salts are left behind. The wind carries the sand grains northeast toward the western escarpment of the Guadalupe Mountains. The air currents rising up over the mountains deposit the white sediments that form the gypsum dunes.

Because of their isolated location and the harsh conditions of the surrounding environment, the gypsum dunes have remained largely undisturbed throughout the years. However, by the 1970s, damage by trespassers and off-road vehicles was threatening the integrity of this unique area. To ensure permanent protection, The Nature Conservancy purchased a portion of the site in 1980 and managed it as a nature preserve until it transferred the property to the National Park Service.

## Geologic Resources on NPS-Owned Land outside the Park Boundary

The two sections of NPS-owned land that are outside the current boundary of the park have key geologic resources. The locations of these 1-mile-square sections, which are bounded by broken lines, can be seen on the Visual Resource Distribution Analysis map.

The section on the south boundary of the park has the largest, most contiguous, and best exposed outcrops of the Castile Formation and Reef Trail Member of the Bell Canyon Formation on NPS lands. The outcrops cover a time interval that correlates to the Upper Permian boundary in China, which is very important for global correlation of the Guadalupian (Middle Permian) stratotype upper boundary. There also is one type locality for an invertebrate fossil in this section.

The section on the eastern boundary near the south end of the park contains numerous important geologic resources. These include

- the official type section of the Pipeline Shale Member of the Brushy Canyon Formation
- three type localities for several species of invertebrate fossils
- significant new localities for vertebrate (fish and shark) and plant remains
- four historically documented paleontological localities
- numerous newly documented paleontological localities
- the most significant fossil ammonoid locality on NPS lands

### Caves

Caves in national park units are automatically considered to be significant for purposes of the Federal Cave Resources Protection Act of 1988. In addition, in accordance with Section 6.3.11.2 of *Management Policies 2006* (NPS 2006b), any cave whose entrance is in a designated wilderness area will be managed as wilderness. A cave management plan for the park was approved in 1991 when only 25 caves were known (NPS 1991). In the most recent count, 32 caves have been identified in Guadalupe Mountains National Park.

Caves in the Guadalupe Mountains are known worldwide for their large chambers and total volume; spectacular speleothem deposition of rare form, size, or beauty; joint controlled development; vertical drops of up to several hundred feet; and rare mineralogy that has resulted from upwelling of sulfur solutions, evaporation, and presence of magnesium in fore-reef and back-reef dolomites. Unfortunately, this is not true for the caves found in Guadalupe Mountains National Park. Because of the geological processes and uplifting that has occurred in the area, park caves are characterized by vertical shafts, poor chamber development, and fewer formations than are found throughout the rest of the Guadalupe Mountain range.

Recreational use of caves in the park is quite low, with very few access permit requests.

This is probably because of the proximity of more well-known, more highly developed and decorated caves in Carlsbad Caverns National Park, within the Lincoln National Forest, and on Bureau of Land Management lands. In addition, most caves in the park are difficult to access, requiring a hike of up to several hours over rough terrain.

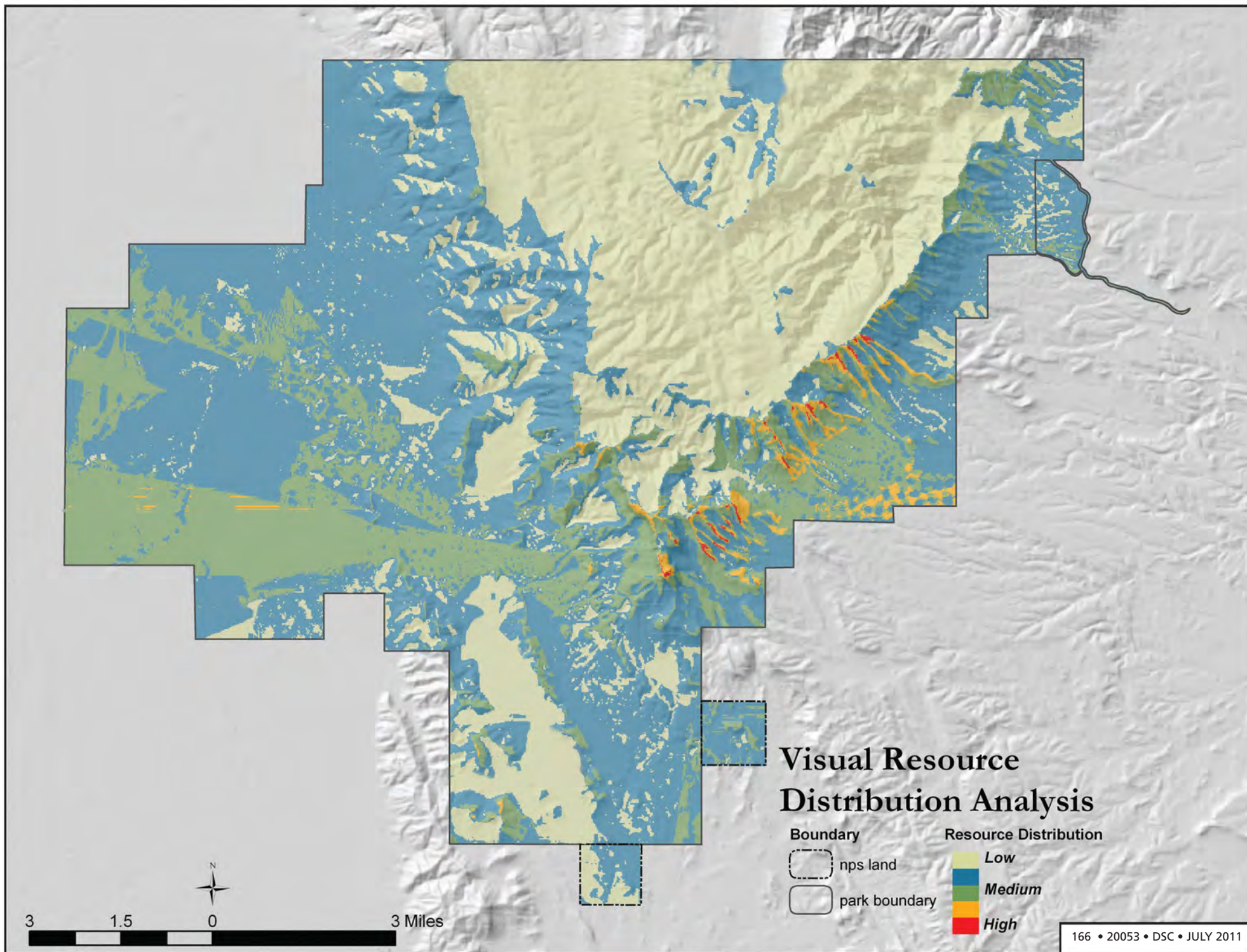
Caves in the park contain important habitat for populations of cave-dwelling or cave-using animals, including bats.

None of the known caves have any appreciable potential for public use in the anticipated interpretive activities for the park. Current cave policy for the area limits cave use to projects that have demonstrable value to the National Park Service in the management and knowledge of cave resources.



Salt Basin Dunes





## PALEONTOLOGICAL RESOURCES

### Fossils

The Guadalupe Mountains of Texas and New Mexico contain the world's largest surface exposure of a Permian-aged reef. Permian fossils are most common in the reef and reef slope deposits of the Capitan Formation and in the eight limestone tongues found in the Cherry and Bell Canyon Formations. The greatest concentration of fossil diversity is in the Capitan Reef and reef slope deposits. Every geological formation in the park contains fossils, and fossils are visible on almost every mile of the park's 82 miles of hiking and nature trails.

At least 22 type fossil localities occur in the park, with more to be added as a literature survey progresses. The total number of fossil species occurring in the park is estimated to be between 800 and 1,200, but a complete census is not available and that figure may be low. Fossils of the Permian Period include representatives of most invertebrate phyla as well as 20 to 40 species of fossil fish, including sharks.

#### *Type Fossil Locality*

*This is a special designation given to the location where a type fossil of a formally named species was found. To name and describe a new species of living or extinct organism, one or a few specimens must be designated as the type or cotypes. These are the reference specimens to which all similar*

*specimens are compared to determine if they belong to the same species. All named species of extinct and living organisms have at least one type specimen. If that specimen is lost or destroyed, new types could be collected from the type locality.*

Using information from publications and geologic maps, it is estimated that 27,000 (31 percent) of the park's 86,416 acres have high potential to produce fossil materials.

### Fossils in Caves

Caves in the park have provided 106 different species of Pleistocene animal and plant fossils. Four park caves contain the world's largest concentration of extinct fossil ground sloth dung deposits, which provide a rich sampling of the local flora occurring here at the end of the Ice Age. Ninety-four sub-fossil vertebrate taxa dated between 1,400 and 2,800 years before present were found in one cave. Fossil packrat middens were found in four caves, providing additional sampling of prehistoric Quaternary floras and faunas.

Several caves contain paleontological deposits or cultural sites. There are intact or partially intact vertically stratified paleontological deposits in at least five caves. Two containing human remains will soon be converted to Native American Graves Protection and Repatriation Act sites, according to consultations with affiliated tribes.

## CULTURAL RESOURCES

### OVERVIEW

Guadalupe Mountains National Park contains important cultural resources related to human use over time by prehistoric and historic peoples. The relative concentration of cultural resources maps identifies the areas of cultural resources within the park.

Cultural resources range from the prehistoric Paleo-Indian and American Indian periods, through the historic American Indian period, into the European American periods of 19th century exploration, military operations, and settlement, which was typified by small-scale ranches. Twentieth century ranching operations consolidated and grew in size. Two of the larger-scale ranchers and landowners fostered conservation efforts that culminated in the park's establishment.

Human occupation over time in the park has witnessed a change in climate from a wetter to a more arid environment and has contributed to a change in some of the vegetation from grasslands to creosote bush and similar plants, which expanded their coverage when overgrazing occurred. Today, grazing continues around the park, except in some of the area around Dell City where underground aquifers make the irrigation of cotton and other crops possible.

### ARCHEOLOGICAL RESOURCES

The presence of humans in what is now Guadalupe Mountains National Park may go back as far as 12,000 years. Paleo-Indians constitute the earliest known humans venturing into the Guadalupe Mountains region; the Paleo-Indian period is about 10,000 BC to 6,000 BC. Outside the park, a projectile point found in association with extinct Pleistocene mammal bones is strong evidence of the presence of these people.

Perhaps around 8,000 BC, Paleo-Indian people entered the Guadalupe Mountains area. These hunters followed the large game that gathered around the numerous springs and water courses that existed in that period, which was moderately wetter than today. They also exploited smaller wildlife and a diversity of plants found in the area's grasslands, canyons, ridges, and high country.

A Clovis projectile point was found in Burnet Cave north of the park in what is now the Lincoln National Forest. It is evidence of humans in direct association with late Pleistocene fauna, such as extinct species of antelope, bison, camel, and horse. A related hearth was radiocarbon dated at 7,500 years BP (before present). Similar Pleistocene species were found in the park in Williams Cave but not in direct association with humans. A Plainview-style projectile point associated with the Paleo-Indian period was discovered in a 2000-2001 archeological survey.

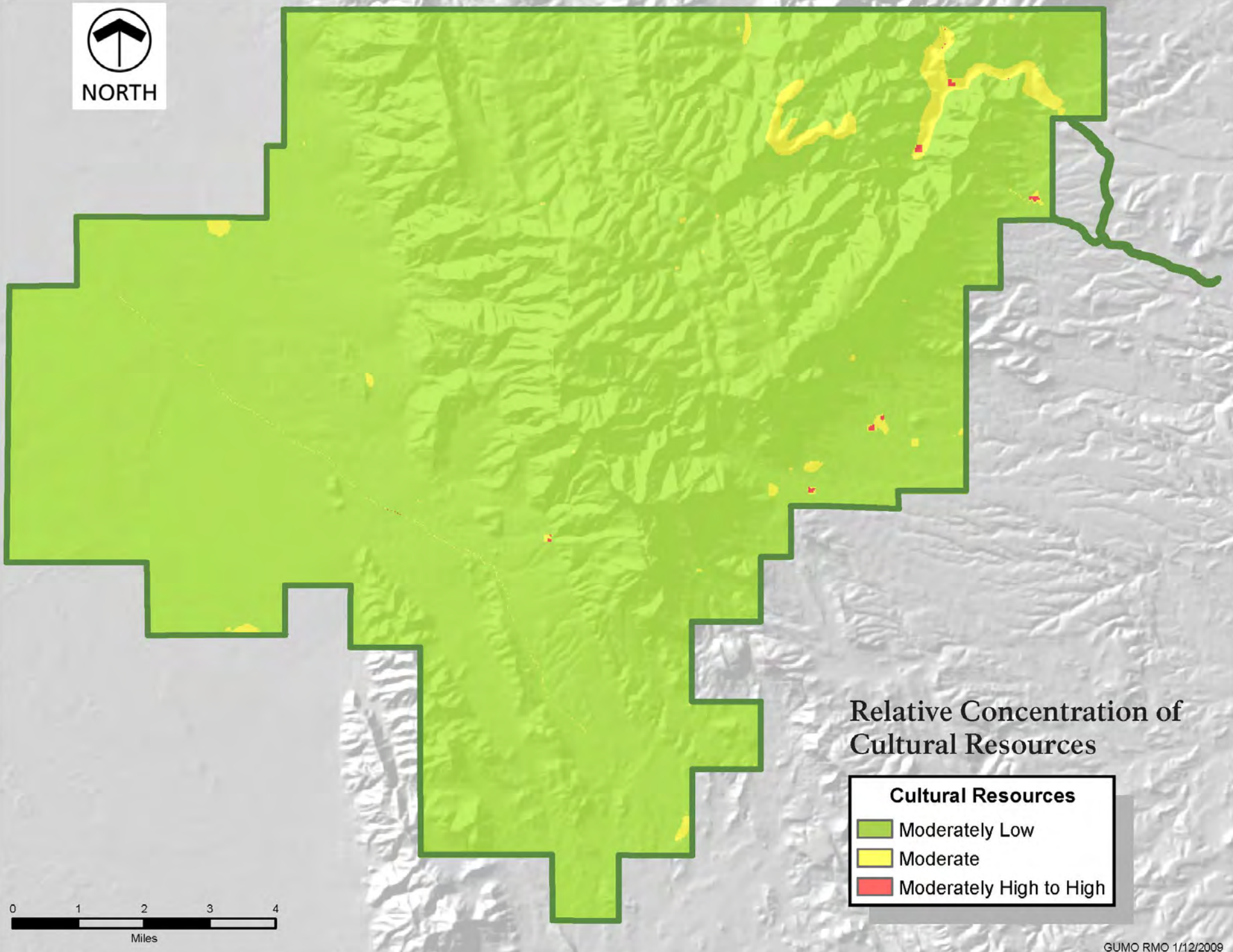


Pictograph in Pine Spring Canyon





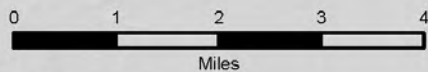
NORTH



### Relative Concentration of Cultural Resources

#### Cultural Resources

- Moderately Low
- Moderate
- Moderately High to High



About 400 archeological sites are known in Guadalupe Mountains National Park and have been recorded with the Texas Historical Commission. These range from the prehistoric Archaic Period (circa 6,000 BC to AD 1) through the late prehistoric but mostly historic Mescalero Apache Period (before European contact to late 19th century) into the historic European American Period of exploration, military scouting, and settlement (16th and 17th centuries to early- to mid-20th century).

The sites consist of

- lithic scatters; cooking pits, hearths, rock shelters, and caves suggesting encampments or habitations
- pictographs and petroglyphs
- traces of exploration, military scouting, and settlement, including stagecoach and ranching roads, remnants of equipment, and other traces of human occupation and habitation

Archeological resources represented in the park begin with the Archaic Period (circa 6,000 BC to AD 1). Generally in the Guadalupe Mountains, the Archaic Period is represented by various styles of lithic projectile points, scrapers, drills, and choppers, and by fire drills, digging sticks, atlatls, darts, and combs of wood. The material culture was further enriched by bone awls, rope of braided hair, and beadwork of trade seashells and local seeds. There were woven articles such as yucca mats and baskets. Sandals, netting, cloth, and cordage were woven or entwined from different plant fibers. Some of these have been found in the park.



Apache Camp

The Mescalero Apaches occupied the Guadalupe Mountains as part of their traditional territory before European contact. Evidence of the Mescalero Apaches includes the many cooking pits in the park, where hearts of agave plants were roasted in pits that were covered with wet leaves and earth. Roasted agave hearts were a staple, so much so that the Spanish appellation, derived from *agave* or *mescal*, became part of the name by which the Mescalero Apaches were known. They also dried this nutritious food for mobile use.

European contact could have occurred as early as AD 1528–36. Recent historical research indicates that Don Diego de Vargas, then governor of Mexico, visited the Salt Flats and, it is believed, the Guadalupe Canyon area of the Guadalupe Mountains in 1692.

Following the Mexican War and the signing of the Treaty of Guadalupe Hidalgo in 1848, the 1849 California gold rush prompted expeditions for exploration, military mapping, and scouting and the search for railroad routes in the Guadalupe Mountains. Examples are those of

- Colonel John S. Ford and Major Robert S. Neighbors in 1848
- Captain Randolph B. Marcy in 1849
- Mister John R. Bartlett in 1850
- Captain John Pope in 1854
- Captain James Longstreet in 1855

The military mapping by Marcy apparently influenced the 1858-59 routing of the Overland Mail Company (also known as the Butterfield Stage after its founder John Butterfield) through Guadalupe Pass. In the park, ruins of the Pinery stagecoach station (discussed below in the section on “Historic Structures”) are near the pass, and traces of the Butterfield Stage route are clearly evident to the northwest. Archeological artifacts could be associated with the station and the route.

Jose Maria Polancio, a guide for Longstreet, is buried south of Guadalupe Pass just outside the park’s boundary, on private land. His headstone says that he was killed on February 1, 1855, apparently by Apaches.

Using the horse, which had been introduced by the Spanish, the Mescalero Apaches regularly raided the American settlements that they viewed as encroachments. U.S. Army expeditions turned to war campaigns, some of which were conducted against the Mescaleros in the park (discussed below). American forces chased Victorio, a well-known Apache war leader, into Mexico where the Mexican army shot and killed him in October 1880. He and his band were renegades from the 1873 Mescalero Apache reservation north of the Guadalupe in New Mexico.

American military action akin to total war against the Apaches occurred in what is now the park at Dog Canyon and McKittrick Canyon under Lieutenant Howard B. Cushing. In 1869, he destroyed and burned two Mescalero villages with vital food caches for the winter, the loss of which was very damaging. Evidence of the fighting and devastation that took place might still be found through archeological work. Archeological work has documented evidence of encampments of the Buffalo Soldiers or African American units of the Ninth and Tenth Cavalry who set up at Pine Spring in 1878 and 1879 and at Manzanita Spring in 1879. An associated rifle pit has been discovered at Pine Spring. The Buffalo



10th Cavalry

Soldiers under Colonel Benjamin Grierson cut Victorio off from critical water sources, causing him to flee to Mexico in 1880. This strategy was made possible by way of Buffalo Soldier mapping expeditions from their Pine Spring and Manzanita Spring encampments in what is now the park.

The McKittrick Canyon Archeological District was listed in the National Register of Historic Places on September 26, 1991. The McKittrick Canyon Archeological District is known to represent the Late Archaic (circa 1500 BC to AD 1), Formative-Transitional (AD 1 to AD 800), and Mescalero Apache Periods (AD 800 to AD 1880).

The district has many of the types of habitation, encampment, and cooking pit sites found elsewhere in the park and illustrates the continuum of human occupation in what is now the park. The district includes sites related to

- the successors to the Paleo-Indians
- the pre-horse ancestors of the Mescalero Apaches
- the hunting and raiding Mescalero Apaches, who became superb horsemen
- the coming of the Texas and Pacific Railway in the early 1880s to Van Horn, Texas, the end of the Mescalero Apache period

As noted above, McKittrick Canyon was a major home base of the Mescalero Apaches.

It was a seasonal, nomadic base they were forced to leave for reservation life farther north in New Mexico.

## **HISTORIC STRUCTURES**

### **Properties Listed in the National Register of Historic Places**

Four historic properties in the park have been listed in the National Register of Historic Places. They include the Frijole Ranch, Pinery Station, Wallace Pratt Lodge, and McKittrick Canyon Archeological District. The latter property is described above in the section "Archeological Resources." The other listed historic properties are described below.

#### **Frijole Ranch House and Outbuildings.**

Frijole Ranch (also known as the Guadalupe Mountain Ranch) was listed in the National Register of Historic Places on November 21, 1978. The Frijole Ranch house once served as headquarters for the Guadalupe Mountain Ranch. Family names like Walcott, Rader, Herring, and Smith are associated with the site of the Frijole Ranch. Local tradition says that a Mister Walcott excavated and constructed a four-room dugout for his family in the 1860s. If so, this was the earliest Anglo dwelling in the region. Local tradition further indicates that two brothers surnamed Rader built the original portion of the Frijole Ranch house, consisting of two rooms of stone, in 1876 to operate a small cattle ranch. Detailed historical research indicates that John B. Rader is listed as a property owner in El Paso County, Texas, in 1879. Culberson County, Texas, was created from part of El Paso County in 1911.

A family named Herring lived at Frijole Ranch after the Raders moved on toward the end of the 19th century. After that, the property (with additions to the ranch house, outbuildings, and landscape configurations) evolved under the ownership of John Thomas Smith. Beginning in April 1895, he applied for a homestead grant. That grant

contains a reference to an original application on March 7, 1867 by an unknown, unnamed grantee. A series of applications followed in 1906 by J. T. Smith under the heading "Application to Purchase Additional Land to Home Heretofore Purchased."

The 1920s was a period of expansion by Smith and his wife, Nella May Carr Smith, who he married in 1889. They were married for 63 years, had 10 children, and made a living by raising cattle, horses, pigs, and chickens and by growing apples, peaches, apricots, plums, pears, figs, pecans, blackberries, strawberries, currants, and some corn. The fresh produce would be sold in Van Horn, Texas, some 60 miles south after a two-day trip in wagons.

Much of the historic fabric of the Frijole Ranch remains in its integrity and variety. Therefore, Frijole Ranch represents the most complete and substantial remnant of early ranching in the Guadalupe Mountains.

The succession of ownership of the Frijole Ranch is important in the establishment of



**Frijole Ranch and the Smith family**

the park. J. T. Smith sold the ranch to Judge Jesse Coleman Hunter, Sr., and his partners, Matthew and Thomas Grisham, on December 27, 1941. The property became known as the Guadalupe Mountain Ranch and was a commercial operation that raised cattle, sheep, and goats and provided recreational hunting of stocked elk and wild turkey to invited guests. Some parcels were

leased for oil and natural gas exploration. The Frijole Ranch house became the home of the ranch foreman, Noel Kincaid. In 1969, through the influence of Jesse Coleman Hunter, Jr., who had conservation values like his father, the Grisham-Hunter Corporation sold its land holdings of 72,000 acres to the National Park Service. These lands became the majority of Guadalupe Mountains National Park, which was authorized by Congress in 1966 and established in 1972.

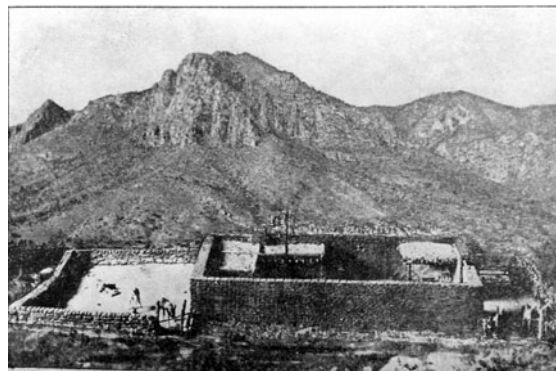
**Pinery Station.** Pinery Station was listed in the National Register of Historic Places on October 9, 1974. This property, called The Pinery for the historic stand of trees in the area, includes the local limestone ruins of a stagecoach horse-changing station. The ruins include a substantial wall several feet high. The station was established at the site because water was available nearby at Pine Springs.

Apparently, Captain Randolph Marcy came across the springs in 1849 while leading a U.S. Army exploration unit. In 1857, John Butterfield, a businessman who founded the American Express Company, won a federal government contract to connect the growing country with regular mail service. Under this contract, he established a stage line, called the Overland Mail Company, from St. Louis to San Francisco.

In a historic rendezvous, on September 25, 1858, in the vicinity of The Pinery (actually a few miles west of Guadalupe Pass), the first two stages passed each other in transit at sunset. One was westbound, the other eastbound. The Pinery operated as a stage stop through August 1859. Despite some harassment by Mescalero Apaches stealing horses and mules, the Overland Mail Company was remarkably dependable and on time. In 1859, a more southerly route was chosen because it had more water sources and was closer to military forts like Fort Stockton and Fort Davis.

After 1859, The Pinery remained a stopping place for people trekking west along what became known as the Emigrant Trail. Marked by Guadalupe Peak from land and air, American Airlines in 1958 considered reconstructing (but never did) Pinery Station in honor of this westward route. Preservation and interpretation of this stage station was a major reason for including the 240 acres surrounding the station within the park.

**Wallace Pratt Lodge.** The Wallace Pratt



Pinery Station, 1858

Lodge, also known as the Pratt Stone Cabin or Pratt Cabin, was listed in the National Register of Historic Places on March 26, 1975. In 1921 Wallace E. Pratt, a professional geologist in search of oil-bearing formations in the region, came to what is now the park. He was a scientist and conservationist as well as a businessman who became a vice president of the Humble Oil and Refining Company, now the Exxon-Mobil Corporation. He appreciated the scenic beauty and geological significance of McKittrick Canyon, named for Captain Felix McKittrick, an early rancher. Pratt acquired land in McKittrick Canyon, and in 1931 and 1932 he authorized the design and construction of a getaway home he called the Stone Cabin, which was located about 2.5 miles up McKittrick Canyon.





Pratt Cabin

Pratt and his wife lived full-time in the Stone Cabin upon his retirement in 1945.

However, because of the occasional flooding of McKittrick Canyon, Pratt built a more modern, less rustic home called Ship-on-the-Desert (described below) outside the canyon.

Beginning in 1958, Pratt donated land and property to the National Park Service. These holdings included some 5,000 acres and both buildings, and became a nucleus of the park.

**Ship-on-the-Desert.** Wallace Pratt constructed this home between 1941 and 1945 to coincide with his retirement from the oil industry. Ship-on-the-Desert was the second home he built in what is now Guadalupe Mountains National Park. Pratt and his wife lived in the building until 1960 when they moved for health reasons to Tucson, Arizona. The house and its associated components were listed in the National Register of Historic Places on December 11, 2011.

### **Properties Eligible or Potentially Eligible for Listing in the National Register of Historic Places**

The following historic structures have either been determined eligible or need a determination of eligibility for listing in the National Register of Historic Places. Those that have been determined eligible have been placed on the park's list of classified structures and are managed as if they were listed. National Park Service will continue to

manage those still requiring a determination of eligibility as if they were listed and will continue to work toward preparing a determination of eligibility and placing them on the park's list of classified structures.

**Bowl Cabin (also known as the Cabin in the Bowl).** The Bowl refers to the area of dense remnant coniferous forest in the high country northeast of Guadalupe Peak and just north of Hunter Peak. This cabin of log construction with a corrugated metal roof was built in the Bowl sometime between 1920 and 1935. It was a working line cabin of the Grisham-Hunter Corporation for ranching operations and served as a hunting retreat for important guests. Joe Plowman, an experienced ranch hand of the corporation, may have built it. Nearby are two water tanks, one of metal and the other of concrete. Water was pumped up the slopes via pipes into the high country. The cabin has been determined eligible for listing in the National Register of Historic Places and is on the park's list of classified structures.

**Felix McKittrick Dugout.** Stone remnants of this dugout structure mark the initial dwelling of pioneer rancher Captain Felix McKittrick. The canyon he lived in bears his name. He was one of the earliest Anglo settlers in what is now the park during the latter part of the 19th century. The potential could exist for archeological resources. Pending evaluation, it is being treated as eligible for listing in the National Register of Historic Places and could be placed on the park's list of classified structures, once a determination of eligibility has been made.

**Dog Canyon Copper Mines.** An assessment has been done and the National Park Service is recommending that the mining features at Dog Canyon be declared eligible for listing in the National Register of Historic Places. A determination of eligibility still needs to be completed and, once done, could result in the addition of the area to the park's list of classified structures.

The Dog Canyon copper mines include a vertical shaft, three prospect pits, and one adit that were filled in for safety reasons. There are four horizontal adits remaining that have been gated for human safety while still allowing access by bats, two unaltered horizontal prospects, and scattered mining equipment and waste-rock piles. A wooden mining cabin built by a man surnamed Buffington in the 1930s northwest of the mine along the Tejas Hiking Trail burned down in 1994 in a wildfire. The cabin's location and other parts of the district could contain artifacts of historical importance. Also see the discussion on these mines under "Cultural Landscapes."



Hunter Line Cabin

**Hunter Cabin (also known as the Hunter Line Cabin).** The Hunter Cabin was built in 1928 of native limestone and mud daub construction with a metal roof. It is a mile or so up McKittrick Canyon from the Wallace Pratt Lodge, mentioned above. It was part of the holdings of Jesse Coleman Hunter, Sr., and his partners, Matthew and Thomas Grisham. The Guadalupe Mountain Ranch holdings of the Grisham-Hunter Corporation became the core of Guadalupe Mountains National Park.

The cabin was used as a line cabin and hunting retreat. It represents the combination of ranching, oil, and conservation interests that ultimately led to the establishment of the park. It has been determined eligible for listing in the National Register of Historic Places and is on the park's list of classified structures.

**Segura Dugout.** This initial family abode of Geronimo Segura was part of the operations

of Williams Ranch. It is mentioned below in the discussion on Williams Ranch. The dugout is being treated as eligible for listing in the National Register of Historic Places. Once a determination of eligibility is completed, it could be placed on the park's list of classified structures.

**Williams Ranch House.** Local tradition calls attention to a woman who, as a young bride, was so uncomfortable about the isolation of what became known as the Williams Ranch house on the western slope of the Guadalupe Mountains that she refused to spend more than one day and one night there. It is unclear who had the house built (with lumber hauled from Van Horn, Texas). However, Henry Belcher, his wife Rena, and daughter Bernice seem to have been the first people to live there, raising as many as 3,000 head of cattle. Water came from nearby Bone Spring in Bone Canyon.



Williams Ranch House

Belcher sold the property to James Adolphus "Dolph" Williams, a cowboy from Louisiana, who arrived in 1917. He remained a bachelor and partnered with Geronimo Segura, an American Indian with a wife and eight children who lived about 3.5 miles away from the ranch house in the Segura Dugout, which was excavated into the wall of Guadalupe Canyon. Williams and Segura switched from cattle to sheep and goats, which are hardier and were better suited to the varied climate and geography of the Guadalupe. Williams ranched there until

1941 and then moved to New Mexico where he died in 1942.

The Williams Ranch house, of frame construction with a gabled roof, and surrounding property constitute a prime example of the relatively small ranching operations in the Guadalupe towards the turn of the 19th into the 20th century. During this period, ranchers had to adapt to changing conditions. This was achieved by switching from cattle to sheep and goats, as mentioned above; by reducing the number of livestock when it was drier; and by piping water from springs.

In general, the turn of the century was wetter than subsequent years. There was more wildlife with greater diversity, including the last of the native bison on the grasslands. Overgrazing by longhorn cattle and the droughts that began to prevail in the late 1910s led to the replacement of grasses by creosote bush, mesquite, and acacia.

The Williams Ranch house has been determined eligible for listing in the National Register of Historic Places and is being managed accordingly. It is on the park's list of classified structures.



Portion of Butterfield Stage Route /  
William Ranch Road

**Butterfield Stage Route / Emigrant Trail.** This stage route of the Overland Mail Company is discussed in the next section under “Cultural Landscapes” and in the previous discussion of Pinery Station. Traceable segments of the route and trail

have been determined eligible for listing in the National Register of Historic Places and have been placed on the park's list of classified structures.

**Remnants of Historic Ranching Activities.** Dates and names like 1869 and Captain Felix McKittrick and 1876 and two brothers surnamed Rader mark the beginning of a cattle ranching presence, and later that of goats and sheep, in what is now the park. Small ranching or farming operations were typical.

In the 1920s and the 1930s, the era of the large rancher and landowner came to the Guadalupe Mountains. Judge Jesse Coleman Hunter, Sr. of Van Horn, Texas, and his partners, Matthew and Thomas Grisham, consolidated vast amounts of land, built structures and facilities throughout their ranch for operational purposes, and developed an extensive watering system for livestock.

The remnants of the high-country watering system consist of pumps, metal and concrete water tanks, and a metal pipeline. Such tanks, previously mentioned in conjunction with the Bowl Cabin, were part of a pipeline system that conveyed water 2,000 feet up the escarpment to a large metal tank that still exists. From there, the water flowed down by gravity to other tanks in the Bowl area. Guadalupe Mountain Ranch employees built the Bear Canyon Trail into the Bowl in the 1930s to lay the pipeline, remnants of which still parallel the trail. The pipeline provided water for high country livestock. In addition to the pipeline, several of the water storage tanks, both metal and concrete, are largely intact for hikers to discover. Equipment left behind could constitute some of the landscape features and would show how the ranchers adapted aspects of the physical geography to their operations.

Other cabins and structures, like Cox Cabin and the Marcus sheep pens, are located within the park boundaries. Aeromotor windmills and associated watering facilities also dot the landscape. Other remnants of

historic ranching activities include interior fences, corrals, gathering pens, and sheep dips.

### CULTURAL LANDSCAPES

Cultural landscapes are geographic areas, including both natural and cultural resources, which the National Park Service manages as cultural resources for their historical significance. They may be associated with historic structures or be independent of a specific structure.

Twelve cultural landscapes have been identified at Guadalupe Mountains National



Ship-on-the-Desert

park and are listed in the NPS Cultural Landscape Automated Inventory Management system. Two have been inventoried and reports are completed.

- A cultural landscape report was completed for the Frijole Ranch in 1995 (NPS 1995a).
- A cultural landscape inventory was completed for the Pinery Station in 1999 (NPS 1999a).

The other ten cultural landscapes in the park remain to be inventoried and so are considered potential cultural landscapes until documentation can be completed.

Many of the cultural landscapes are associated with historic structures that either

are listed in, or are potentially eligible for listing in the National Register of Historic Places. Relevant related aspects for these properties were described previously in this chapter under “Historic Structures.”

### Frijole Ranch Cultural Landscape

The Frijole Ranch with its historic structures and accompanying lands comprises a cultural landscape that is the most complete and substantial remnant of European American settlement in the southern Guadalupe Mountains. The Frijole complex shows the development and evolution of the region’s settlement via a continuum of diverse agricultural use. It dates from the last quarter of the 19th century into the mid-20th century and includes cattle ranching, other forms of animal husbandry, and small-scale commercial fruit growing. Together they formed the base of the Frijole farmstead’s practices and products characteristic of raising cash and subsistence crops in a remote area of west Texas.

The Frijole Ranch developed around a spring and a continuously flowing stream in conjunction with other nearby springs such as Manzanita Spring. Along with wells and irrigation channels, these provided water for animals, crops, and people.

Prior to European American settlement of the area, Manzanita Spring was a seasonal camp for the Mescalero Apache people. Here, they roasted agave plants in cooking pits, often called mescal pits.

Walnut trees at Manzanita Spring are part of the landscape, as are many original structures of stone and wood at and surrounding the main ranch house to the southwest of Manzanita Spring. The character-defining features of the Frijole Ranch cultural landscape include a schoolhouse, springhouse, bathhouse, bunkhouse, barn, stone wall, stone retaining wall, flagstone walkways, irrigation channels, and the main ranch house. In the latter’s vicinity, as part of the landscape, are oaks whose acorns provided food for hogs

brought to the enclosed front yard of the ranch house to feed and fatten.

### **Military Encampment / Activity Areas**

Places in the park like McKittrick Canyon, Dog Canyon, Pine Springs, and Manzanita Spring were mentioned under archeological resources in association with U. S. Army incursions and encampments related to exploration and military campaigns against the Mescalero Apaches. These are important in American history because the Indian Wars campaigns changed the American Indian way of life to life on reservations and because of their association with African Americans who served effectively in the army as Buffalo Soldiers. (This name is generally believed to be a Lakota appellation reminiscent of the soldiers' curly hair and that of the curly manes of bison.) Landscape features would relate to how the soldiers negotiated and adapted various aspects of the physical geography toward their mission.

### **Pine Springs Store / Café**

Walter Glover purchased land near Pine Springs as early as 1913. He and his wife, Bertha, developed a stop for tourists that included a gas station, store, café, and guesthouse with cabins for overnight stays. The National Park Service acquired the Pine Springs Café and outbuildings in 1972.

A life estate was granted to the owners, Walter and Bertha Glover. After their deaths, a daughter, Mary Hinson, was authorized by Secretary of the Interior Donald Hodel to continue the operation until January 1, 1992.

For safety reasons, the structures of this site were razed in February 1994 after the extension to operate expired. What is left of the site as a cultural resource is not a landscape with historic buildings, but rather a potential site for historical archeological work and interpretation.

### **Bowl Cabin (also known as the Cabin in the Bowl)**

The Bowl Cabin was identified above under "Historic Structures" as needing a determination of eligibility for listing in the National Register of Historic Places. The cabin is associated with ranching in the high country during the first third of the 20th century and with the associated placement of facilities in the Bowl among the characteristic ponderosa pine, southwestern white pine, and Douglas-fir. Landscape features could include equipment left behind that shows how the ranchers used the high country in their operations.

### **Butterfield Stage Route / Emigrant Trail**

The route of the Overland Mail Company, also known as the Butterfield Stage, is readily apparent running northwest-southeast on the western side of the park. Its alignment, which is shown on the Existing Conditions Map, is marked by occasional ruts and a coach-wide trace slightly depressed in the ground.

The "Historic Structures" section provided information regarding the stagecoach company and its stop, the Pinery Station, in what is now the park. Landscape features could relate to the course and conditions of and scenery along the route. Designation of such a cultural landscape would help visitors imagine what it was like to travel in a light, "celerity" stagecoach at four to five miles an hour, day and night, between St. Louis and San Francisco. This route remained in use by people trekking west along what became known as the Emigrant Trail after August 1859 when the Overland Mail Company switched to a more southerly route.

### **Dog Canyon Mining Landscape**

The Calumet and Texas Copper Mines (commonly called Calumet Mine) operated from the 1880s through the 1930s and into the 1960s when tests were done to estimate the value of the mineral rights for sale to the federal government as part of the park's

establishment. Operation was often sporadic and related to copper prices. Names of individual mines included Hardscrabble Number 1, Good Hope, and Valley.

Landscape features associated with mining included one vertical shaft, three prospect pits, and five adits (also known as horizontal passages or tunnels into a mine) plus equipment scattered on the ground and waste-rock piles. One adit was filled in for safety, and the other four have been fitted with bat gates to keep humans safely out and while allowing access by bats. This area is also discussed in the “Historic Structures” Section.

#### **Hunter Cabin (also known as the Hunter Line Cabin)**

This limestone and metal-roofed cabin is discussed in the section on “Historic Structures.” The cabin as evidence of ranching could figure into the landscape features.

#### **McKittrick Canyon Archeological District**

This district is discussed above under “Archeological Resources.” The types of archeological sites reflect prehistoric and historic American Indian ways of life. Archeological resources could include landscape features that reflect habitation styles and subsistence practices.

#### **Wallace Pratt Cabin**

This limestone structure is discussed in the “Historic Structures” Section. The Stone Cabin, as Wallace Pratt called it, along with the associated outbuildings with rock walls, paving stones, surrounding landscaped terraces, and other landscapes features, would all be part of the cultural landscape in this unique scenic setting in the midst of McKittrick Canyon. This setting and the important geological context with the Permian Reef was an integral aspect of geologist Wallace Pratt’s view of the canyon.

#### **Ship-on-the-Desert**

The second limestone home, completed by Wallace Pratt in 1945 in what is now the park, is discussed above under “Historic Structures.” In the designated cultural landscape, landscape features could include limestone walls, landscaped terraces, paving stones, stone picnic tables, an irrigation system, native plantings such as Texas madrone, and the pleasing harmony of the soft gray and brown rock tints of the native limestone with the surrounding hills and the building (designed by New York City architect Newton Bevin to resemble an oil tanker), which is symbolic of Pratt’s status as a world-renowned petroleum geologist.

#### **Williams Ranch**

This sturdy, isolated, but functional, frame dwelling, with a prominent early 20th century gabled roof, is discussed in the previous section on “Historic Structures.” Landscape features would include the layout of stone corrals to the house, the pumping and storage of water (in metal tanks) from nearby Bone Canyon in the escarpment, and the stark beauty of the setting. Striking contrasts abound, with salt flats in one direction and, in the opposite direction, gently rising bajadas or slopes and then the sharply rising western escarpment of the Guadalupe.

### **ETHNOGRAPHIC RESOURCES**

Ethnographic information has been collected from ethno-historical works, interviews, and American Indian consultations conducted by the park staff. Ethnographic resources relate to particular places or areas that contemporary peoples link to their traditional way of life and cultural heritage. Although no ethnographic resources have been identified as traditional cultural properties eligible for listing or listed in the National Register of Historic Places, such nominations are still possible.

Ethnographic landscapes are generally larger in area and broader in scope than the vernacular or designed historic landscapes that are often considered under the category of cultural landscapes. Ethnographic landscapes are important ethnographic resources. Two ethnographic landscapes are mentioned. One involves the Mescalero Apaches, and the other involves the Tigua Indians of Ysleta del Sur Pueblo. Components of these landscapes would be ethnographic resources.

### **Our Lady of Guadalupe**

Catholic Christians come to the vicinity of the park to see the image of Our Lady of Guadalupe on El Capitan. Family pilgrimages to see this image are particularly common among Catholics of Hispanic heritage. The full-face image is viewable at just the right angle from the visitor turnout on the highway through Guadalupe Pass. Our Lady of Guadalupe is the patron saint of the Americas, and her personage is part of Catholicism as practiced in the southwestern United States.

### **White Painted Woman**

El Capitan and Guadalupe Peak, on the southern end of the Guadalupe Mountains, form a prominent park landmark that is visible from more than 50 miles away. When looking at the mountains from a distance, the recumbent profile of White Painted Woman can be seen along the ridgeline. The story of White Painted Woman as a beneficent being is related to the origin of the Mescalero Apaches set in the heart of the Guadalupe Mountains. The Guadalupes are their traditional homeland and place of origin. White Painted Woman forms a clear and distinct landscape that is very important culturally to the Mescalero Apaches.

### **White and Red Sand Dunes**

The Tigua Indians of Ysleta del Sur Pueblo have traditionally used the Salt Basin Dunes and the Salt Flats on the western side of the park for hundreds of years. They indicate

that the white and red dunes are culturally important today.

### **American Indian Traditional Plant Gathering**

What is now Guadalupe Mountains National Park is part of the traditional homelands of the Mescalero Apache, now of New Mexico; the Tigua Indians of Ysleta del Sur Pueblo near El Paso; and 11 other American Indian tribes with cultural affiliation to the park. They occupied these lands both before and after European contact, through most of the 19th century.

Members of the Mescalero Apache and the Tigua, as well as members of other tribes as they moved through and occupied the Guadalupes, used the resources of the mountains and gathered plants and other resources. Gathering of plants and the fruit of plants, like agave, piñon nuts, and sumac berries, were a traditional use of these lands by American Indians. Based on this traditional plant-gathering practice, the whole park could be considered an ethnographic resource. Some areas, however, may have been more heavily used than others or may have more cultural importance. Because of the ties to the cultural heritage and identity of the American Indians who used these resources, any traditional plant-gathering areas should be regarded as an ethnographic resource.

### **MUSEUM COLLECTIONS**

The park's museum collections comprised of cultural artifacts, natural history specimens, and archival records number over 150,000 items. About 112,000 items are stored in the park. Over 40,000 items are stored in other NPS facilities or institutional repositories. NPS facilities storing specimens from Guadalupe Mountains National Park include

- Carlsbad Caverns National Park in New Mexico

- Harpers Ferry (Interpretation) Center in Harpers Ferry, West Virginia
- Intermountain Support Office in Santa Fe, New Mexico
- Western Archeological and Conservation Center in Tucson, Arizona

The universities include

- Sul Ross State University at Alpine, Texas
- Texas A&M University at College Station
- The University of Texas at Austin
- The University of Wisconsin at Madison
- The University of Manchester in the United Kingdom

A 19th century stagecoach that is part of the park's collections is on loan and display in Carlsbad, New Mexico, at the Carlsbad Museum and Fine Arts Center.

Specimens and artifacts relate to geology, zoology, botany, archeology, ethnography, and history. The latter include historic photographs and material cultural items from archeological and historic sites. Basket fragments and braided hair for rope are examples of ethnographic artifacts. The collections include archival materials documenting the objects.

The collections in the park are protected by a modern detection and security alarm system. The collections are housed in part of the visitor center and administration building that has limited access. Only authorized personnel may enter. A dry-pipe, overhead sprinkler system with heat-sensitive thermocouplers activates localized flow of water only in the location of a fire. Some collections are stored in other facilities, because of the lack of space in the headquarters facility.



## VISITOR UNDERSTANDING AND EXPERIENCE

One of the fundamental purposes of the National Park Service is to providing for visitor enjoyment, understanding, and stewardship. Many actions proposed in this general management plan could affect patterns of visitor use and the type and quality of visitor experiences. Components of the visitor experience include, but may not be limited to, visitor access, scenic views, orientation and interpretation, recreation activities and destinations, and visitor services.

The category of visitor understanding and experience includes what park visitors learn (cognition), feel (attitudes), do (behavior), and sense (experience). Interpretation includes personal and nonpersonal services that communicate park interpretive themes (the essential concepts, relationships, and stories associated with the park) and help visitors establish personal and emotional connections with the park.

- Personal services include interpretive talks and guided walks, and informal services such as information desk attendance and roving contacts.
- Nonpersonal interpretation is accomplished through exhibits, audiovisual programs, wayside (outdoor) exhibits, publications, and websites.
- Educational services are structured programs conducted with scheduled groups such as schools, universities, and organizational groups. Program objectives relate both to school curricula and to park themes and objectives.
- Orientation services inform visitors about park resources and experiences. Orientation services include information encouraging proper, safe, low-impact behavior. Orientation is provided

through personal and nonpersonal services.

Interpretation, education, and orientation are provided both onsite and offsite.

The current interpretive program at Guadalupe Mountains involves a variety of facilities, interpretive media, and services. Together, they provide opportunities for visitor understanding and appreciation of park themes and significance.

A 1996 to 1997 survey of visitors to Guadalupe Mountains National Park was conducted by the University of Texas at El Paso (1997). The survey collected data during spring, summer, and fall. In descending order, the five most desired experiences in this park are seeing wilderness and scenery, hiking, viewing nature, seeing wildlife, and experiencing solitude or quiet. Preferences for seeing the scenery vary according to many factors, especially visual and topographic characteristics of the scenery and visitors' personalities, attitudes, and expectations.

## VISITATION

Recent visitation is summarized in table 8. Annual recreational visitation to the park has averaged about 200,000 for the past decade. Spring often is the busiest season, with substantial visitation in summer and fall. Winter brings the fewest visitors. Most visitors enter the park at the Pine Springs visitor center.

A visitor survey showed that 55 percent of visitors were from Texas, 35 percent were from out of state, and 10 percent were from other countries (University of Texas at El Paso 1997). Families were the most common group type.

**Table 8: Recreational Visitation in 2000-2006**

	2000	2001	2002	2003	2004	2005	2006
January	11,704	14,032	10,880	11,005	10,961	10,681	11,031
February	13,505	12,379	12,344	10,441	9,524	9,646	10,526
March	24,991	23,395	27,689	20,533	21,998	23,586	22,156
April	20,291	19,693	20,069	17,016	17,345	17,345	16,446
May	18,296	21,264	19,152	17,691	18,676	16,724	16,145
June	18,273	18,780	18,087	16,124	15,898	13,736	14,344
July	17,340	22,244	20,100	16,390	16,487	16,218	14,255
August	16,383	17,042	15,083	13,157	14,032	10,742	11,318
September	14,151	15,441	14,658	11,982	12,976	10,159	12,178
October	18,052	24,600	18,435	20,658	21,055	15,173	19,707
November	14,720	21,425	15,585	15,439	13,570	15,085	16,506
December	11,056	12,012	10,829	10,921	9,829	11,288	9,545
Total	198,762	222,307	202,911	181,357	182,351	172,388	176,163

## HIKING

Guadalupe Mountains National Park features more than 80 miles of hiking trails, with outstanding opportunities for both day hiking and overnight trips. Hiking is a popular visitor activity. More than half the park is designated wilderness, and there is no water or other visitor services beyond the trailheads.

Most trails are rated moderate to strenuous. Many lead to the top of the escarpment, which can be accessed from just a few points below. Trails are well defined and graded. Off-trail hiking is discouraged because it can be dangerous and damaging to the resources.

The Guadalupe Peak Trail is one of the more popular of the strenuous hikes. It begins near the Pine Springs visitor center and climbs 4.2 miles to the summit of Guadalupe Peak. There is a designated campsite about a mile from the summit, but many hikers accomplish the round-trip hike in a day. Views from the top are magnificent. The hike requires considerable stamina and moderate expertise.

Moderate to easy day hikes are available on the Frijole and Foothills Trails and at McKittrick Canyon, the Pinery, Smith Spring, and Dog Canyon. The McKittrick Canyon Trail is one of the most popular trails in the park, and is accessible to almost all hikers. The Dog Canyon trailhead is accessible by road from the north. There is a ranger station and a campground near the trailhead. The Tejas and Bush Mountain Trails begin at the Dog Canyon trailhead. Both trails wind across the top of the escarpment through a variety of vegetation zones and landscapes, and afford great views.

Guadalupe Canyon historically was the primary access point to hike Guadalupe Peak. To make the hike less difficult, the National Park Service built a trail from Pine Springs Canyon. Access to Guadalupe Canyon and this portion of the national park has always been across a narrow strip of private land by an informal trailhead, with parking along the highway right-of-way. Historically, the landowner has allowed public access across this strip of land, and many visitors and visiting geologists access the park via this route.

## **BACKPACKING**

There are 10 backcountry campgrounds in the park. Backpacking requires a free permit, available at the Pine Springs visitor center or the Dog Canyon ranger station. Backpackers must camp in designated locations to reduce impacts to resources. Campers seldom perceive backcountry sites as crowded, and only 2.5 percent reported feeling crowded in the survey conducted by the University of Texas at El Paso (1997). Water must be packed in.

## **WILDERNESS**

In 1978, Congress designated 46,850 acres, or more than half of Guadalupe Mountains National Park, as wilderness. A wilderness, in contrast with areas where man and his works dominate the landscape, is recognized as “an area where earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain” (Wilderness Act 1964).

The high peaks, deep canyons, and abundant wildlife and plant life of the Guadalupe Mountains Wilderness are all integral parts of a dynamic, diverse natural system. In this wilderness, park visitors can have a primitive and unconfined experience that is primarily affected by natural forces and provides opportunities for solitude, inspiration, and experiencing and observing nature.

## **CAMPING**

Two campgrounds, at Pine Springs and Dog Canyon, are accessible by motorized vehicle. The Pine Springs campground is in a mostly open desert area just off Highway 62/180 near the visitor center. Water, wheelchair accessible restrooms, a service sink, and pay telephone are available, but no showers. There are 20 sites for tents and 19 sites for recreational vehicles. The recreational vehicle sites are defined by painted lines and numbers on the parking lot pavement. There are no hookups or dump stations. One recreational vehicle site is wheelchair

accessible. Crowding is an issue, and 21 percent of visitors surveyed felt crowded (University of Texas at El Paso 1997).

The Dog Canyon campground is in a secluded, forested canyon on the north side of the park. Because of the higher elevation it remains cooler than the Pine Springs campground in the summer. The campground has nine tent sites and four recreational vehicle sites, but no hookups or dump stations. Restrooms have sinks and flush toilets but no showers.

## **HORSEBACK RIDING**

The park offers diverse riding opportunities. About 60 percent of the trails are open to horses. Riders must bring their own stock, because there are no horses or pack animals for hire near the park. There are stock corrals near the trailheads at Dog Canyon and Frijole Ranch; each has four pens and will accommodate up to 10 animals. All stock trips must start and end at one of these trailheads.

Riding is limited to day trips only. A free backcountry permit is required for all stock trips.

## **SIGHTSEEING AND SCENIC DRIVING**

The key management-related provision of the Organic Act (16 *United States Code*, Section 1) is the statement that the National Park Service “shall promote and regulate the use of the Federal areas known as national parks, . . . which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

In Guadalupe Mountains National Park, much of this “scenery” is a direct or indirect result of the geology of the park. The Visual Resource Distribution Analysis map

identifies the park's scenic resources. The prime scenic experience for most visitors is the Capitan Reef and the adjoining peaks of the Guadalupe Mountains. These features are visible from many miles away as one approaches the park.

Few roads extend into the park. Roads primarily include the approaches to the Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, and Salt Basin Dunes areas. The Williams Ranch road is recommended only for four-wheel-drive, high-clearance vehicles, and a key must be obtained at the visitor center for the gate.

The scenery from park roads includes the Capitan Reef and surrounding landscape. Although no great elevations are achieved, the open west Texas landscape and the looming reef offer dramatic panoramas.

Often called the "most photographed spot in Texas," the view of the Guadalupe Mountains from Highway 62/180 through the park and through Guadalupe Pass seldom fails to impress observers. The massive face of El Capitan towers 3,000 feet above Guadalupe Canyon. One of the prime scenic experiences for most visitors is this spectacular view from Guadalupe Canyon and Guadalupe Pass. For visitors who will not be hiking the trails because of time or physical constraints, this is the best close-up view of the mountains they will have. Together with the expansive views to the west of the Salt Flats and the lower elevations below the pass, this constitutes the primary scenic route of the park.

Visibility monitoring at Guadalupe Mountains National Park was conducted using photography from a 35-millimeter camera from 1983 through 1995. From 1988 through 2006, visibility monitoring was involved the use of a light extinction transmissometer.

Visibility at Guadalupe Mountains averages 80 miles and can exceed 155 miles on the clearest days. Dust, particularly during the spring windy season, historically has been a

source of decreased visibility. Additionally, visibility is being adversely affected by increasing pollution from the region's metropolitan areas, power plants, and smelters. Haze has reduced visibility at times to less than 50 miles, and maximum visibility currently occurs only 1 percent of the time, with a 50 percent reduction in visibility occurring half the time. The result has been a measurable reduction in visibility, which is of paramount importance to visitor appreciation of the park's scenic vistas from both lowland and high country locations.

## INTERPRETIVE PROGRAMS

Formal interpretive programs are primarily evening illustrated talks (slide shows) at various park locations. These programs are given daily from Memorial Day through Labor Day. Other illustrated talks are given in March (during spring break) and during fall color season.

Because one of the main focal points of the park is hiking, roving interpretation is extensively done on park trails, especially in McKittrick Canyon. Four self-guided nature trails with interpretive brochures include the Pinery Trail, McKittrick Canyon Nature Trail, Permian Reef Geology Trail, and Indian Meadow Trail at Dog Canyon.

Outreach programs are given to regional educational and community groups, and other interested parties.

- Onsite orientation programs are given to educational groups.
- Educational activities for students are available both onsite and offsite. Most onsite school programs occur during spring and fall.
- The park has a web page that is frequently updated.
- Both Junior Ranger and Senior Ranger programs are available.
- Site bulletins covering a variety of topics are available as handouts and mailings.

- The park staff organizes several college credit seminars each year.

## **VISITOR FACILITIES AND OTHER DEVELOPED AREAS**

### **Pine Springs Visitor Center**

The Pine Springs visitor center is the park's primary visitor center and the initial point of entry for most visitors. The building also includes park headquarters.

The natural history of the park is interpreted at this facility. Interpretive media include an introductory slide program (with large-format images) and exhibits on geology, flora, and fauna. A bookstore operated by the Carlsbad Caverns Guadalupe Mountains Association offers theme-related publications and other items. Rangers and volunteers at the information desk provide interpretation, orientation, and visitor assistance. The center is open year-round.

### **Pine Springs Campground and Trailhead**

Pine Springs is the location of recreational vehicle and tent campgrounds and a picnic area. At nearby Frijole Ranch, there are public stock corrals (available by reservation) for horseback riding. The park's main trailhead and parking lot at Pine Springs provide access to most park trails, which offer hiking, backpacking, and nature viewing opportunities.



**Pine Springs Visitor Center  
and NPS Headquarters**

### **The Pinery**

The crumbled remains of walls mark the site of the 1858 Overland Mail Company (also called Butterfield Stage) station. It is easily reached by a paved, wheelchair-accessible trail from the Pine Springs visitor center or from U.S. Highway 62/180. A guide to the history of the Pinery is available at the visitor center.

### **McKittrick Canyon**

McKittrick Canyon cuts into the Guadalupe Mountains, is framed by 2,000-foot-high limestone walls, and features longest only permanent stream in the park. It is one of the prime attractions in the park for day visitors. Although it is famous for its spectacular fall foliage, the canyon attracts thousands of hikers in all seasons. McKittrick Canyon is designated only for day-use.

At the trailhead is the McKittrick Canyon contact station, which is open year-round, as staffing permits. Visitors can obtain a trail guide describing resources and features along the 2.3-mile-long trail to the Pratt Cabin. Outdoor exhibits and a slide presentation are also available at the contact station.

Pratt Cabin was built of local limestone by Wallace Pratt, an early park supporter who later donated land to create the national park. The cabin has been furnished and is open when volunteers are available. Picnic tables are available outside the cabin. The trail extends past Pratt Cabin along the stream to the Grotto, Hunter Line Cabin, and up to McKittrick Ridge, which leads to the top of the escarpment.

A self-guided interpretive nature trail (0.9 miles long) with wayside exhibits starts at the McKittrick Canyon contact station. The Permian Reef Geology Trail also begins at the McKittrick Canyon contact station. Visitors can obtain a trail guide for the 2.5-mile-long hike into the Capitan Reef geological formations and another 2 miles to the top of the ridge. Excellent fossil exposures are found along this trail.



McKittrick Canyon from the Notch

A power line was installed in the canyon to Pratt Cabin after the National Park Service acquired the property. It initially was determined necessary to operate the cabin as a residence and ranger station. The need for daily power no longer exists.

#### **Frijole Ranch**

The rehabilitated 1870s ranch house at this site is equipped with exhibits of frontier life at the ranch and in the area, and serves as a cultural history museum. The wheelchair-accessible building is open only intermittently when volunteer staffing is available. Other ranch buildings include a barn, one-room school house, pump house, bath house, bunk house, and spring house. The proximity of Frijole Ranch to several springs makes it an excellent location for birding.

Outside the cultural landscape, visitor facilities currently are being developed in the vicinity of the trailhead for the Foothills, Frijole, and Smith Spring Loop Trails. These include a parking lot, picnic area, new

interpretive and trailhead signs, a vault-type toilet, and improved access for people with impaired mobility. The public stock corral is located on the ranch access road.

#### **Williams Ranch**

The Williams Ranch house was built in 1908, and its exterior has been rehabilitated. Although it is accessible only via a four-wheel-drive, high-clearance road (which also can be used by mountain bikes), this area offers excellent views of the western side of the Guadalupe Mountains, a close look at the arid reaches of Chihuahuan Desert landscape, and an encounter with the stark historic presence of a lonely, isolated ranch house, well preserved by the dry desert air. Visitors to Williams Ranch must check in at the Pine Springs visitor center to obtain a key and information brochures. Williams Ranch is designated as a day-use area. It also is the terminus of El Capitan Trail from Pine Springs.



View from the Williams Ranch Porch

### **Dog Canyon**

Visitors must travel 60 miles from major highways to reach the solitude and beauty of Dog Canyon. It is located in the north part of the park near the New Mexico state line. Dog Canyon has a ranger station, picnic area, tent and recreational vehicle campground, and stock corrals (by reservation) for horseback riding. Trails leading from Dog Canyon offer excellent hiking, backpacking, and bird watching opportunities.

### **Dell City Contact Station**

The Dell City contact station is located on Main Street in Dell City. It provides an orientation and information point for park visitors, with a particular focus on the Salt Basin Dunes. The contact station is infrequently staffed, but its information is always available and it provides a location to

drop off the key to the Salt Basin Dunes parking area, saving visitors a 120-mile-long round trip back to park headquarters at Pine Springs.

### **Salt Basin Dunes**

The Salt Basin Dunes are the second largest gypsum dune field in North America. The Salt Basin Dunes are accessed via a dirt road leading from Farm-to-Market Road 1576 out of Dell City. Parking is available at the park boundary, and visitors can walk the 2 miles to the dunes. Visitors who obtained a key at park headquarters in Pine Springs can drive a little more than a mile inside the park boundary to a small parking area, where a 0.75-mile-long trail leads to the dunes. The key can then be dropped off at the Dell City contact station.

### **CLIMATE CHANGE**

Because humans are so adaptable, climate change may have limited effects on total park visitation. However, it could alter the timing of park visits. As shown in table 8, most visitation occurs in the spring and fall when temperatures are more moderate. Visitor numbers currently tend to dip in the warmest summer months and coldest winter months. Higher temperatures associated with climate change could shift more park visitation toward the winter.

## THE SOCIOECONOMIC ENVIRONMENT

The National Environmental Policy Act requires an examination of social and economic impacts caused by federal actions. Jurisdictions that most likely would be affected by this general management plan include

- Culberson and Hudspeth Counties, Texas
- Dell City and Van Horn, Texas
- Eddy County, New Mexico
- Whites City, Queen, and Carlsbad, New Mexico

### REGIONAL SETTING

Guadalupe Mountains National Park is in a remote, arid, sparsely populated area of west Texas. It is about 110 miles east of El Paso, Texas, and 55 miles southwest of Carlsbad, New Mexico. Carlsbad Caverns National Park is about a 45-mile-long drive to the northeast of the park.

Most of Guadalupe Mountains National Park, including all major facilities and trailheads, is in Culberson County. The western portion of the park, including the Salt Basin Dunes that were added in 1988, is in Hudspeth County. Culberson County is about 3,812 square miles, ranking as the fifth largest county in Texas in land area. Hudspeth County covers 4,571 square miles and is the state's third largest county.

The Texas/New Mexico state line forms the northern boundary of the park, and Eddy and Otero Counties in New Mexico are just north of the park. Eddy County is readily accessed via U.S. Highway 62/180, which passes through the southeast portion of the park and is the area's primary highway. New Mexico Highway 137 through Eddy County provides access from the Carlsbad area to the Dog Canyon area. The park has few road connections to Otero County, which is west of Eddy County, and, therefore, has limited socioeconomic effects on that county.

Therefore, Otero County was not considered here or in the analysis of impacts in Chapter 4.

Texas Highway 54 intersects U.S. Highway 62/180 just south of the park and connects to Interstate-10 in Van Horn, about 55 miles to the south. Van Horn is the county seat of Culberson County and is home to more than 80 percent of the county's residents. In addition to the regional service centers of El Paso and Carlsbad, other communities near the park include Dell City, about 9 miles west of the park's western boundary, and the unincorporated community of Queen, located about 16 miles north of the Dog Canyon campground.

### ECONOMIC CONDITIONS

Park features that affect economic conditions include its remoteness; rugged topography; arid climate; and rich but relatively limited recreational, historical, and cultural resource inventory. Annual park visitation ranks approximately in the middle (185th of 359) among NPS units (NPS 2006a), with 174,157 visitors in 2006 (see table 8). Most visitation is day-use, and is concentrated at or near the visitor center and other developed activity areas along the U.S. Highway 62/180 corridor.

The park annually accounts for more than \$10 million in annual economic stimulus in the surrounding, multi-county region. However, its socioeconomic contributions are not readily apparent because the effects are dispersed over a large area.

The two largest metropolitan centers near the park are at El Paso and Odessa-Midland. Both have experienced economic and population growth. Closer to Guadalupe Mountains National Park, the population is dispersed and economic development has been limited. As shown in table 9, population in the three counties is stable or declining, and limited growth is expected in the



populations of Culberson, Hudspeth, and Eddy Counties between now and 2030.

Employment and income information is provided in tables 10, 11, and 12. The economies of Culberson and Hudspeth Counties are small, undiversified, and have not experienced much growth. As shown in table 10, employment dropped in both counties between 1990 and 2000. In contrast, employment in Eddy County increased by more than 10 percent during the period.

More recent data show these patterns are continuing. Based on information from the U.S. Census Bureau (2007), private, nonfarm employment decreased between 2000 and 2005 by 4.3 percent in Culberson County and by 19.9 percent in Hudspeth County. In Eddy County, private, nonfarm employment rose by 12.4 percent during this period.

The economy of the region depends heavily on natural resource extraction, particularly oil and gas. Agriculture, travel, tourism, and the public sector also contribute to the local economy. Per capita incomes, shown in table 12, are behind state and national averages by substantial margins, and unemployment generally exceeds state averages.

Unemployment in the region for year 2000 averaged 3.5 percent in Hudspeth County, 10.2 percent in Culberson County, and 6.6 percent in Eddy County. These averages compare to statewide averages of 3.6 percent for Texas and 4.9 percent for New Mexico.

Agriculture in the region consists of livestock ranching and farming. Cattle ranching occurs on the wide expanses of private rangeland. The Census Bureau's *Census of Agriculture* lists 92 farms covering nearly 1.57 million acres in Culberson County and 147 farms with 2.5 million acres in Hudspeth County. Eddy County has 467 farms covering nearly 1.28 million acres. Before the establishment of the park, lands now in the park were used for ranching.

Crop production involves only a small share of the local agricultural land because it relies on pumping groundwater for irrigation. In

the three counties, the percent of land that is irrigated ranges from less than 1 percent to about 3.5 percent. However, the value of crops raised on these lands is disproportionately high, representing a large part of the annual value of agricultural products sold. The farming activity is concentrated in a few locations, including the Dell City area near the park's western boundary.

The lack of economic diversity in Hudspeth and Culberson Counties is evident in table 11. As shown, self-employment and government employment accounts for about a third of all employment in both Culberson and Hudspeth Counties. Statewide in Texas, those sectors account for just a fifth of the total employment. In Eddy County, New Mexico, about a quarter of the total employment occurs in these sectors.

Public sector employment includes military, federal civilian, state, and local government employment. County governments account for most of the public sector employment. State government employment primarily includes highway maintenance facilities, including a Texas Department of Transportation facility adjacent to the park's residential and services complex. Federal employment includes Department of Energy staff associated with the Waste Isolation Pilot Project, a nuclear waste disposal facility near Carlsbad; U.S. Forest Service personnel; Bureau of Land Management office staff; and NPS personnel associated with Guadalupe Mountains National Park and Carlsbad Caverns National Park.

**Table 9: County Population with Projections Through 2030**

COUNTY	2000	2006	2010	2020	2030
Culberson, TX <sup>a/</sup>	2,975	2,525	3,351	3,596	3,703
Hudspeth, TX	3,344	3,320	3,815	4,146	4,314
Eddy County, NM <sup>b/</sup>	51,658	51,815	55,274	58,514	61,066

a/ Source: Texas Water Development Board 2006.

b/ Source: New Mexico Bureau of Business and Economic Research, 2004

**Table 10: County Employment, 1990 and 2000**

	CULBERSON COUNTY, TEXAS	HUDSPETH COUNTY, TEXAS	EDDY COUNTY, NEW MEXICO
1990 <sup>a/</sup>	1,419	1,173	18,649
2000 <sup>a/</sup>	1,293	1,127	20,591
Difference 1990 to 2000	-126	-46	1,942
Percent change	-8.9	-3.9	10.4

a/ Source: U.S. Census Bureau 2007

**Table 11: Employment by Worker Class, 2000**

EMPLOYMENT CATEGORY	CULBERSON COUNTY	HUDSPETH COUNTY	EDDY COUNTY	TEXAS, STATEWIDE
Self-employed and unpaid family	59 (4.6%)	85 (7.5%)	1,808 (8.8%)	684,865 (7.4%)
Private wage and salary workers	890 (68.8%)	695 (61.7%)	15,310 (74.4%)	7,202,769 (78.0%)
Government workers	344 (26.6%)	347 (30.8%)	3,473 (16.9%)	1,346,738 (14.6%)

a/ Source: U.S. Census Bureau 2007

**Table 12: Per Capita Income**

COUNTY	1990 <sup>a/</sup>	2000 <sup>b/</sup>	2005 <sup>c/</sup>	PERCENT OF 2005 U.S.
United States	\$14,420	\$21,587	\$34,471	100.0
Texas, Statewide	\$12,904	\$19,617	\$32,460	94.6
New Mexico, Statewide	\$11,246	\$17,261	\$27,889	80.9
Culberson County, TX	\$7,632	\$11,493	\$17,727	51.4
Hudspeth County, TX	\$7,994	\$9,549	\$14,804	42.9
Eddy County, NM	\$10,490	\$15,823	\$29,132	84.5

a/ Source: U.S. Census Bureau 1990.

b/ Source: U.S. Census Bureau 2007.

c/ Source: Bureau of Economic Analysis 2007.

Local employment in the retail trade and services industries is supported in part by highway travelers. This employment sector originated with stagecoach travel through the area, and evolved over time to include widely spaced clusters of gas stations, cafes, and small motels along the highways. The closest highway-travel-oriented services to the Guadalupe Mountains National Park visitor center are more than 30 miles distant, in Whites City, New Mexico. Overnight lodging is available in Van Horn and El Paso, Texas, and Whites City and Carlsbad, New Mexico. In Eddy County, travel and tourism is a mainstay of the local economy, with more than 11,500 jobs reported in retail trade and services in the year 2000 census.

Oil and gas development and production is an important segment of the natural resources industry, particularly in Eddy County, New Mexico. After years of weakness brought about by lower energy prices, active exploration and development is again occurring in the area. Other natural resource development in the region consists of scattered sand and gravel operations and limited-scale mineral mining in Culberson County.

### **PER CAPITA INCOME**

Per capita income trends in the three counties mirror differences in their sizes and diversities, and also are affected by general inflationary trends and governmental transfer payments to individuals. As shown in table 12, per capita incomes in all three counties have risen over time but are substantially higher in Eddy County than in the two Texas counties. Per capita income levels are substantially lower than those of the state of Texas and the United States.

Below average personal incomes translate into local poverty levels that are substantially above the national average. According to the U.S. Census Bureau (2007), 12.7 percent of the nation's population lived in poverty in 2004. For the same period, the poverty levels in Culberson (22.0 percent), Hudspeth (26.6 percent), and Eddy (16.4 percent) Counties were all higher than the national value and the New Mexico (16.7) and Texas (16.2) statewide rates.

### **POPULATION**

As shown in table 13, the population in Culberson County has declined since 1970, but population has increased in Hudspeth and Eddy Counties. During this period, the population of the United States increased by 47.3 percent, from 203 million in 1970 to 299 million in 2006.

Recent trends by community are shown in table 14. Culberson and Hudspeth Counties are sparsely populated, as is Eddy County outside the metropolitan areas of Carlsbad and Artesia. Except in Culberson County, where population declines occurred in all areas, the populations in communities were stable or declining, with population increases in unincorporated areas.

Population projections prepared by the respective states were included in table 9. Despite recent stable or declining populations, substantial growth has been predicted over the next 25 years. Projections include a 47 percent increase in Culberson County, a 30 percent increase in Hudspeth County, and an 18 percent increase in Eddy County by 2030.

**Table 13: Population, 1970 to 2006 <sup>a/</sup>**

COUNTY	1970	1980	1990	2000	2006 (ESTIMATED)	CHANGE 1970 TO 2006
Culberson County, TX	3,420	3,333	3,407	2,975	2,525	-26.2 percent
Hudspeth County, TX	2,392	2,774	2,915	3,344	3,320	38.8 percent
Eddy County, NM	41,013	47,855	48,605	51,658	51,815	26.3 percent

a/ Source: U.S. Census Bureau 2007 and previous years.

**Table 14: Regional Population, 1990 to 2006 <sup>a/</sup>**

AREA	1990	2000	2006 (estimated)	CHANGES 1990 TO 2006	
				People	Percent
Culberson County, TX					
Van Horn	2,930	2,435	2,108 <sup>b/</sup>	-822	-28.0
Balance of County	477	540	417 <sup>c/</sup>	-60	-12.6
Total Population	3,407	2,975	2,525	-882	-25.9
Hudspeth County, TX					
Dell City	569	413	411 <sup>b/</sup>	-158	-27.8
Balance of County	2,346	2,931	2,909 <sup>c/</sup>	563	24.0
Total Population	2,915	3,344	3,320	405	13.9
Eddy County, NM					
Carlsbad	25,320	25,625	25,410 <sup>b/</sup>	90	0.4
Artesia	10,775	10,692	10,597 <sup>b/</sup>	-178	-1.7
Balance of County	12,510	15,341	15,808 <sup>c/</sup>	3,298	26.4
Total Population	48,605	51,658	51,815	3,210	6.6

a/ Population data are from U.S. Census Bureau (2007) unless otherwise noted.

b/ Source: City-Data.com 2007

c/ Calculated based on information from the above two sources.

## HOUSING

Most of the housing in the three-county area is concentrated in or near the communities. Many of the remaining units are associated with local ranch and farm operations dispersed throughout the rural portions of the counties.

The total housing listed in the 2000 census included 1,321 units in Culberson County, 1,471 units in Hudspeth County, and 22,249 units in Eddy County. These totals represented increases of 35, 183, and 2,115 units, respectively, compared to 1990.

Vacancy rates in the region, ranged from 12.9 percent in Eddy County to 25.8 percent

in Hudspeth County. Some of the vacant units are second homes used for seasonal occupancy or recreation, but most were for sale or rent.

The nearest concentrations of homes to the park are in Dell City, Texas and the unincorporated community of Queen in Eddy County. Only a few private homes are near the park, and primarily include farm residences to the north in Eddy County.

Over the years, several plans to develop large-tract rural subdivisions to the west and southwest of the park have been announced. Little infrastructure development has occurred, except the grading of a street system and installation of some telephone

cables. Consequently, only a couple of homes, midway between Dell City and the park's western boundary, have been built.

### **NEARBY COMMUNITIES**

Guadalupe Mountains National Park's visitor facilities and onsite personnel housing are all some distance from nearby communities. Consequently, the park must be self-sufficient in many respects. For instance, the park operates its own water and wastewater treatment systems, and fire trucks and an ambulance are garaged in the park's developed area. However, important economic, social, and public service links exist between the park and nearby communities.

Carlsbad, about 55 miles northeast of Pine Springs, is the nearest urban area offering a wide range of shopping and services for consumers and businesses. Many park personnel live in the Carlsbad area. Amenities for residents and visitors include a large base of overnight lodging for visitors to Carlsbad Caverns National Park and Guadalupe Mountains National Park, scheduled commercial air service, the 131-bed Carlsbad Medical Center, and the Carlsbad Community Branch College campus of New Mexico State University.

El Paso is about 110 miles west of the park and has a population of more than 560,000. This city provides comprehensive services similar to those available in major metropolitan areas nationwide. The city of Juarez, Mexico, across the international border from El Paso, has a population of about 2 million people. Many park visitors are Mexican citizens who live in the Juarez area.

An important relationship exists between the park and Fort Bliss, which is near El Paso. Under the Military Assistance to Safety and Transportation (MAST) program, military medical personnel, air ambulances, and other helicopters can provide support to civilians and other federal agencies during

emergencies. Over the years, personnel and aircraft based at Fort Bliss have provided rescue and emergency medical transport services for the park.

The farming community of Dell City has limited overnight lodging, but provides essential retail and service functions for residents of the town and surrounding region, including park employees and their families. Some of these include public schools, with a total enrollment of about 100 students in grades kindergarten through 12; a post office; several churches; a local newspaper; grocery stores; and cafes. Two Hudspeth County sheriff's deputies are stationed in Dell City.

Van Horn is the Culberson County seat and the primary local government entity in relation to the park. Local government, travel-oriented services, and retail trade are mainstays of the local economy. In addition to the services described for Dell City, Van Horn has motels, a bank, and the 25-bed Culberson Hospital. School system enrollment in Van Horn totals about 750 students.

A number of mining and energy companies are located near the park. These include Windpower Partners, which operates the Delaware Wind Project located between Van Horn and the park.

Other nearby communities that have socioeconomic ties to the park include the unincorporated communities of Queen and Whites City in New Mexico.

- Queen is about 16 miles north of the Dog Canyon campground. The store and café offers groceries, ice, and gasoline for visitors using the Dog Canyon campground and trailhead.
- Whites City is near the entrance to Carlsbad Caverns National Park along U.S. 62/180 between the park and Carlsbad. Its service station, motel, campground, and retail stores are the closest services to travelers east of the park.

## **SOCIOECONOMIC CONTRIBUTIONS OF THE PARK**

Guadalupe Mountains National Park, its staff, their households, and the visitors to the park are integral parts of the region's economic and social structure. Some of the key dimensions of the park's role are described below.

Authorized staffing at the park is currently at 40 full-time-equivalent employees. That number represents more than 2 percent of all employment in Culberson County. The park's staff is supplemented by seasonal campground hosts and other volunteers, and occasionally by firefighters deployed to manage wildfires at the park, construction contractors, and others who contribute to employment in the county.

The budget for Guadalupe Mountains National Park in fiscal year 2000 was nearly \$2.06 million. Since its establishment, about \$48 million in direct operating and capital construction expenditures have been made in association with the park. This includes about \$30 million in operating costs and \$18 million in capital construction expenditures.

About 80 percent of the park's annual operating budget is salaries, wages, and fringe benefits paid to park personnel. The remainder pays for items such as utilities, office supplies, supplies for vehicle and facility maintenance, and travel. Substantial portions of the annual expenditures circulate through the regional economy in the form of consumer and business purchases, yielding indirect economic impacts.

Spending by park visitors provides an even more important contribution to the local economy. The most recent estimate is that the three-county area receives about \$8.4 million in annual visitor spending.

The total annual contribution of Guadalupe Mountains National Park to the area economy is over 13 million annually. An estimated 202 jobs in the regional economy are attributable to the presence of the park. However, the park's impact is not readily apparent because of the very large geographic area in which they occur.

## **PARK OPERATIONS, FACILITIES, AND EQUIPMENT**

### **PARK OPERATIONS**

Guadalupe Mountains National Park is administered by a park superintendent and several division chiefs who are headquartered at Pine Springs. The superintendent is responsible for managing all areas within the park boundaries, directing park staff, and interacting with other government agencies, tribes, private interests, and the general public. In 2006 there were 40 full-time-equivalent park staff positions. The park uses participatory decision making to engage its employees in managing the park.

Park operational activities are organized into the Management, Administration, Visitor and Resource Protection, Resource Management, Interpretation, and Maintenance divisions. Staff members are stationed primarily at the Pine Springs headquarters building and maintenance facility, with a small number stationed on the north side of the park at Dog Canyon. There is intermittent staff presence at other public park facilities, including the McKittrick Canyon visitor contact station, the Frijole Ranch museum, and the Dell City contact station. In addition to NPS personnel, staffing is supplemented by donated labor through the park's Volunteers in Parks (VIP) and Student Conservation Association (SCA) programs.

#### **Management and Administration Divisions**

The Management Division is responsible for park communications, external affairs, park planning, human resource planning, information technology, financial management, and park leadership. The Administration Division provides procurement, contracting, fiscal support, and human resource services. In 2006, there were four full-time-equivalent employees in

the Management and Administration Divisions.

A critical activity for park management is maintaining ongoing relationships with external stakeholders. The park is surrounded by private lands and lands managed by other federal and state agencies. It is a major priority for management to communicate and interact with neighbors, local and state agencies, and other federal agencies. In addition, 13 American Indian tribes have traditional ties to the park, which results in ongoing government-to-government consultations on a variety of issues.

Some administrative functions, including the division chief and personnel services, are shared with Carlsbad Caverns National Park and stationed at an administrative building in the town of Carlsbad, New Mexico. The sharing of administrative staff saves costs, improves communications, and enhances services for both parks. The town office and staff is base-funded by Carlsbad Caverns National Park.

#### **Visitor and Resource Protection Division**

The Visitor and Resource Protection Division is responsible for the safety of visitors and protection of park natural and cultural resources. The chief ranger coordinates these functions. In 2006, there were 8.5 full-time-equivalent employees in visitor protection.

The protection ranger staff is responsible for law enforcement, emergency services, special-use permits and fee collection. The division provides 24-hour protection coverage for the park's 86,416 acres, more than 82 miles of trails, 30 miles of roads, two frontcountry campgrounds, and 10 backcountry campgrounds. In addition, protection ranger staff members provide emergency responses to wildfires, vehicle and structural fires, search and rescue,

automobile accidents, and other emergency medical services.

There are 4.5 full-time-equivalent staff with primary responsibilities of fire management that includes, suppression of wildfires, conducting prescribed burns, performing fuel reduction work, and monitoring fire effects on vegetation communities.

### **Resource Management Division**

The natural and cultural resource management staff conduct resource inventory and monitoring, resource restoration, geographic information system data management, oversees the research permit program and coordinates or conducts research. Resource monitoring includes species of management concern, air quality, water quality and quantity, and is establishing baseline conditions for natural sound and night sky darkness. Management actions have concentrated on air and water resources and the protection of plant and animal species and their critical habitats. In 2006, there were 3 full-time-equivalent resource management staff.

Division staff also manage cultural resources, including 400 archeological sites, 18 historic buildings, 12 cultural landscapes, ethnographic resources, and a museum collection containing more than 112,000 specimens. Management actions have included inventory, monitoring, condition assessments, and in some cases, stabilizing. As described in the Cultural Resources section of this chapter, the large museum collection is dispersed over a variety of locations including park headquarters, academic institutions, and other NPS storage facilities. The continual addition of research specimens to the collection produces an ongoing challenge for data and specimen management, storage, and access.

### **Interpretation Division**

The Interpretive Division provides informational programs and media to park visitors, with special outreach to people in

neighboring communities. The division's primary functions are to interpret park resources and orient visitors to the park facilities and services. In 2006 the Interpretation division included 5 full-time-equivalent employees.

Division staff members are responsible for the operation of major park visitor facilities, including the Pine Springs visitor center, Frijole Ranch museum, and the McKittrick and Dell City contact stations. Some visitor facilities are staffed by volunteers and are open on an intermittent basis. Interpretive rangers also conduct onsite educational programs, contact visitors on frontcountry and backcountry trails, and manage the volunteer and student intern programs. All park interpretive media, such as site bulletins, bulletin boards, park newspaper, wayside exhibits, and the park's website are developed or coordinated by division staff. Interpretive rangers also develop education curricula and conduct programs in neighboring communities, including Dell City and El Paso, Texas, and Carlsbad, New Mexico.

### **Maintenance Division**

The maintenance division is responsible for the operations and maintenance of all park buildings, roads, utilities, parking areas, campgrounds, and trails. Most division staff members work out of the maintenance facility at Pine Springs. In 2006, the maintenance division had 15 full-time-equivalent employees. The division is separated into two subgroups, buildings and utilities, and roads and trails.

The responsibilities of the building and utilities group include the following:

- maintain, repair, and stabilizing historic and nonhistoric structures
- operate domestic water and wastewater systems
- maintain heating and cooling systems and emergency power generation systems



- carry out plumbing, electrical, and masonry repairs and upgrades
- provide janitorial and waste collection services

The responsibilities of the roads and trails group include the following:

- grade, compact, and chip-seal roads and parking areas
- inspect and repair roads and bridges
- maintain and repair frontcountry and backcountry trails
- install, mend, and replace fences and gates
- repair and replace park signs
- repair and service the park's fleet of more than 50 automobiles, trucks, and pieces of heavy equipment
- maintain pack mule and horse stock for backcountry trail work and rescue

Maintenance at the park is particularly challenging because of the remote location, harsh environment, and widely dispersed park infrastructure. Park buildings, roads, and trails are constantly subject to strong winds, flash floods, strong sun exposure, and wide temperature fluctuations, leading to shortened maintenance cycles and frequent, unscheduled repairs. These challenges require the park maintenance staff to be largely self-sufficient, with wide-ranging proficiencies and specialized materials and equipment.

### **Volunteers**

Volunteers carry out a critical role in park operations. Several visitor facilities, such as the Frijole Ranch cultural museum and the Dell City and McKittrick contact stations, are staffed mainly by volunteers. Volunteers perform some curation activities for the museum collection, and volunteer campground hosts assist with visitor and resource protection at the Dog Canyon and Pine Springs campgrounds. Each season, volunteers improve visitor safety and enjoyment by maintaining and repairing hiking trails. Annually, volunteers contribute

more than 15,000 hours to park operation, representing more than \$221,000 in net benefits to the park, or almost 10 percent of the annual park budget.

### **PARK BUDGET**

In 2006 the park budget was \$2.374 million, which represented about a 3 percent annual growth from 1980. The park budget is supplemented with funds from other sources to meet specific program, operation, or maintenance needs. In 2004, the park received about \$420,000 in supplemental funding for projects such as resource management programs and facility upgrades.

In 2003, Guadalupe Mountains National Park implemented an entrance fee program in addition to use fees for the campground. In 2007, the park implemented a park-specific annual pass under the authority of the Federal Lands Recreation Enhancement Act of 2004 (Public Law 108-447). Under this new authority, the park retains 100 percent of these fee revenues. Fees have averaged \$88,300 over the past four years, and revenues beyond the cost of collection are used for special projects. Activities that have been supported by fee revenues have involved visitor interpretive and wayside exhibits, cultural resource preservation, accessibility for visitors with impaired mobility, visitor services, and maintenance. Projects that have been completed because of these funds include new wayside exhibits at Dog Canyon and in the west side of the park, new geology exhibits, upgrades of audiovisual projection equipment and audiovisual programs, a new roof for the Williams Ranch house, rehabilitation of the Hunter Cabin, replacement of the septic system at the historic Ship-on-the-Desert, and a new shade structure at the visitor center.

The National Park Service developed a *core operations strategy* in 2006 to identify the core functions necessary to maintain the purpose and significance of the park. The strategy is a tool to help the National Park

Service identify more efficient and effective approaches to park operations and management. Implementation of the strategy would provide the superintendent with more operational flexibility to achieve park goals with respect to resource protection and management, visitor opportunities, and park operations.

The organizational structure developed to implement the core operations strategy relies on fewer full-time NPS staff to manage the park. This provides the superintendent with greater flexibility to address park needs, including hiring term or seasonal employees, or contractors as appropriate to complete resource management actions in the field. The operational changes also provide the flexibility to address other park needs as necessary. It is anticipated that implementation of the core operations strategy would provide the park with enough flexibility to initiate actions to support implementation of this general management plan or to address other park priorities, such as deferred maintenance.

## VISITOR FACILITIES

Facilities open to visitor use include the visitor center, three contact stations (including one outside the park), a museum, more than 82 miles of frontcountry and backcountry trails, trailheads, two developed campgrounds, historic structures and ruins, 30 miles of paved and unpaved scenic park roads, and parking lots. There also are 10 designated, minimally improved backcountry campgrounds.

### Pine Springs Visitor Center and Headquarters Building

Public use facilities are concentrated in the Pine Springs complex.

- The visitor center at, with restrooms, interpretive displays, a small picnic area, and parking lot, is the hub of visitor services.

- An interpretive trail that is accessible to visitors with disabilities goes from the visitor center to the nearby ruins of the Butterfield Stage stop, known as the Pinery.
- A tent campground, another small picnic area, and a trail staging area and parking lot for the system of trails that extends to Guadalupe Peak and the high country plateau are near the mouth of Pine Spring Canyon. A portion of the trailhead parking lot serves as a camping area for self-contained recreational vehicles.
- A comfort station on the perimeter of the trailhead and parking lot area serves trail users and adjacent camping areas.

### Frijole Ranch Cultural Museum

A little more than a mile east of Pine Springs is a historic ranch homestead called Frijole Ranch. The ranch house contains exhibits and artifacts and is operated as a museum. Outside the cultural landscape, visitor facilities currently are being developed, and will include a parking lot, picnic area, interpretive and trailhead signs, and restroom. The public stock corral for use by visitors who bring their own horses is located on the ranch access road about a half-mile south of Frijole Ranch.

### Ship-on-the-Desert

Northeast of Frijole Ranch is the Ship-on-the-Desert site, the second residence constructed by Wallace Pratt in the area that became part of the park. Constructed in the 1940s, the site is used as an incidental education center and meeting facility, and provides quarters for visiting researchers.

### McKittrick Canyon Visitor Contact Station

The visitor contact station is at the end of a 3-mile-long, scenic park road near the mouth of McKittrick Canyon. The development area includes a parking lot, ranger contact station, exterior exhibits,

picnic area, and restrooms. The facility serves visitors using an adjacent interpretive trail loop and trails leading up the canyon and to the upper plateau. Pratt Cabin is located about 2.5 miles up McKittrick Canyon. This historic residence was built by Wallace Pratt and was used as his first residence in the area. Today, it serves as an interpretive center (when it is staffed) and as a visitor destination. Also in the canyon are the Grotto and the historic remnant of the Hunter Line Cabin, which is maintained as a discovery site that visitors can explore.

### **Dog Canyon Ranger and Visitor Contact Station**

Dog Canyon is a development area on the north side of the park. It includes a ranger contact station, comfort station, tent and recreational vehicle camping sites, and a small picnic area. The area also serves as a trailhead for an interpretive loop trail and other trails that extend into the backcountry and upper plateau. The developed area has a public corral for visitors who bring their horses for trail riding.

### **Dell City Visitor Contact Station**

The National Park Service maintains a storefront contact station in Dell City, Texas, west of the park. The unstaffed station primarily provides information on the Salt Basin Dunes.

### **Salt Basin Dunes**

Visitors can park at the park boundary and hike into the dunes or they can obtain a no-fee permit and gate access key at the Pine Springs visitor center. The key opens a locked gate at the park boundary (accessed by a dirt road from Dell City). Visitors can then drive to a six-car parking area 1 mile inside the park boundary.

### **Butterfield Stage Route**

A segment of the historic Butterfield Stage route transverses the park from the northwest corner by the Salt Basin Dunes to its southeast boundary about a mile from the

junction of U.S. Highway 62/180 and Texas Highway 54. Part of the road to Williams Ranch follows the alignment of the stage route.

### **Williams Ranch**

Visitors with a permit can access a locked gate on the park's south boundary, off U.S. Highway 62/180, and travel north on a high clearance (four-wheel-drive) road to the historic Williams Ranch house and site. The cultural landscape includes the exterior of the Williams Ranch structure, adjacent garden site, and corral structures.

### **Other Historic Structures and Features**

Other historical structures include the Bowl Cabin, Cox Cabin, and Segura Dugout. In addition, there are numerous historical remnants, such as abandoned ranching features or mining equipment that are mainly in backcountry and designated wilderness areas. Most need to be assessed for National Register of Historic Places significance.

### **Roads and Trails**

The park has 8.5 miles of paved roads and 21.5 miles of gravel and primitive roads that provide access to backcountry and designated wilderness areas.

The Williams Ranch road is a gravel and dirt surfaced, high-clearance road extending 7.3 miles north from U.S. Highway 62/180. Major washes along the route are conveyed under the roadbed by metal culverts, and the road surface is rough-graded after heavy rains to maintain accessibility by high-clearance vehicles. Imported gravel is used on the first 1 mile of road, where the road is a shared right-of-way. The remaining 6.3 miles have a native gravel and earth surface.

More than 82 miles of hiking trails provide access to interpretive sites and to the interior of the park. Most trails are designated as horse and hiking trails, but some are limited to use by hikers only. No-fee permits are required for overnight camping in the

backcountry and designated wilderness areas.

### **OPERATIONS FACILITIES AND EQUIPMENT**

Operations facilities are used by park staff to support and maintain park operations. The park maintains facilities and utility systems to support administrative and maintenance functions and visitor access, interpretation, and visitor-use opportunities.

#### **Pine Springs Visitor Center and Headquarters Building**

The 8,100-square-foot Pine Springs headquarters building and park visitor center is north of Highway 62/180, just southeast of the Pine Springs trailhead and adjacent to The Pinery. In addition to providing visitor center functions, the building houses the headquarters offices and a museum storage area. Currently, there is inadequate space for these functions in the headquarters building, and two park housing units have been converted to administrative use.

#### **Pine Springs Maintenance Facility**

The park's maintenance area is south of U.S. Highway 62/180 and east of the Pine Springs visitor center. The maintenance facility includes offices, shops, vehicle bays, fueling, and material storage.

#### **Visitor Protection and Resource Management Operation**

The Visitor Protection and Resource Management offices are in two of the three-bedroom houses at Pine Springs. Personnel using this space include the park's natural and cultural resource management staff, geographical information system office, wildland fire management officer, and park law enforcement and resource protection rangers. The Visitor Protection and Resource Management operations at Pine Springs also include the:

- wildland fire cache, which houses two wildland engines and a water tender
- emergency services building, which houses the park's structural fire truck, ambulance, and search-and-rescue cache

#### **Park Housing**

The remote location of the park requires some onsite housing to provide for emergency services and after-hours protection. Park housing is at Pine Springs and Dog Canyon. Most of the housing units were constructed in 1982, but a duplex at Dog Canyon was added in 1998.

There are 25 housing units in the park, including 22 at Pine Springs and three at Dog Canyon. Pine Springs housing includes 12 single-family units (three bedrooms each), eight apartments, and two (four-person) dormitories. Two of the single-family units have been converted to administrative uses. At Dog Canyon, the housing includes one single-family unit and a two-unit duplex.

#### **Dog Canyon Ranger Station**

The Dog Canyon developed area has a ranger station office and three NPS housing units. The developed area also has a barn/maintenance building and a corral for NPS horses and mules.

#### **Other Support Facilities and Equipment**

Infrastructure located in the developed areas of the park supports visitor services, visitor safety, and park operations.

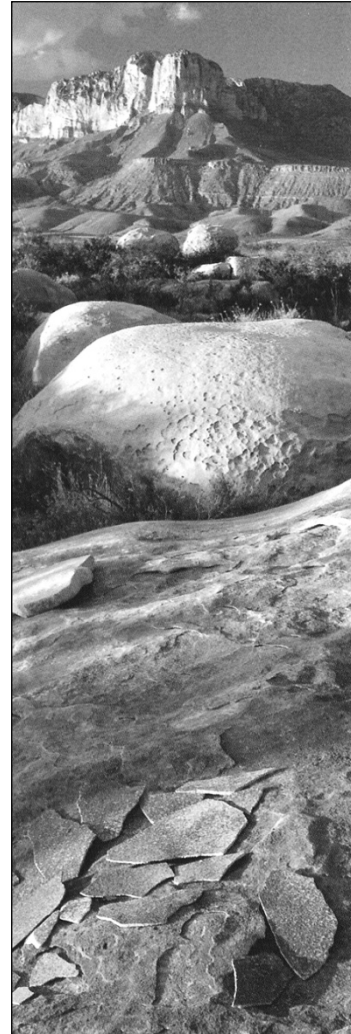
- Radio facilities. The park staff maintains a parkwide radio communications system to support operations, emergencies, and law enforcement. Two repeaters in the park's backcountry support this communications system and provide needed coverage.
- Electrical and phone services. These services are supplied by commercial sources outside the park. The park

maintains emergency generators to provide electricity during outages.

- **Water system.** Well houses and wells with submersible pumps are located at Pine Springs, McKittrick Canyon, Pratt Cabin, Ship-on-the-Desert, and Dog Canyon. State-certified NPS maintenance staff members maintain these systems.
- **Wastewater systems.** At Pine Springs there is a large sand filter treatment system with a disposal field for sewage from the visitor center and headquarters building and residences. Septic systems with evapotranspiration fields are at the Pine Springs campground, McKittrick contact station, Dog Canyon, and Ship-on-the-Desert. A vault-type toilet is being installed at Frijole Ranch. State-certified NPS maintenance staff members also maintain these facilities. (Two cesspool systems, one at Pratt Cabin and one at the Frijole Ranch house, did not meet state treatment standards, and the toilet facilities at these locations have been closed.)

### **Emergency Services**

Law enforcement rangers who live onsite in park housing provide 24-hour emergency coverage in the park. The park has one ambulance and one structural fire truck to support emergency operations. Wildland fire engines and a water tender support wildland fire emergencies.



**Boulders and El Capitan**





## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES







## INTRODUCTION

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if a proposed action is implemented. In this case, the proposed federal action would be the adoption of a general management plan for Guadalupe Mountains National Park. The following portion of this document analyzes the environmental impacts on natural resources, cultural resources, visitor understanding and experience, the socioeconomic environment, and park operations of implementing the four alternatives. The analysis includes both beneficial and adverse effects of implementing the alternatives.

Because of the general, conceptual nature of the actions described in the alternatives, their impacts can only be analyzed in general, qualitative terms. Thus, this environmental impact statement should be considered a programmatic analysis. When specific developments or other actions are proposed for implementation after this general management plan has been adopted, appropriate, environmental and cultural compliance documentation will be prepared in accord with National Environmental Policy Act and National Historic Preservation Act requirements.

This chapter begins with a description of the methods and assumptions used for analyzing the impacts. Each analysis also considers cumulative impacts (see below) and presents a conclusion. At the end of each alternative, there is a brief discussion of unavoidable adverse impacts; irreversible and irretrievable commitments of resources; and the relationship of short-term uses of the environment and the maintenance and enhancement of long-term productivity. The impacts of each alternative are briefly

summarized in table 7 at the end of Chapter 2.

### CUMULATIVE IMPACTS AND PROJECTS THAT MAKE UP THE CUMULATIVE IMPACT SCENARIO

A cumulative impact is described in the Council on Environmental Quality's regulation 1508.7 as follows:

*"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

To determine potential cumulative impacts, projects in the area surrounding Guadalupe Mountains National Park were identified.

This process included conducting meetings and phone calls with county and town governments, state and federal land managers, and other stakeholders. Potential projects identified as cumulative actions included any past activities and any planning or development activity that was currently being implemented or that would be implemented in the reasonably foreseeable future. These actions are briefly described below.

#### Past Actions That Could Contribute to Cumulative Effects

**Cattle Grazing.** Active range management on private and public lands around all sides of the park has greatly reduced the native plant populations, densities, and distribution. This in turn has altered soils and led to erosion. Ranching activities involve the use of herbicides to kill unwanted plants and the introduction of exotic species of plants. In some areas, natural hydrology and landforms have been modified to create dams and stock tanks.

These provide water for domestic livestock and sometimes attract native park wildlife. Fences have been built to limit the movement of livestock into the park.

**Subdivision Development.** Subdivision development exists or is proposed on the west side of the park in the Salt Basin and on the south boundary east of the Patterson Hills (surrounding the NPS-owned square-mile section on the south that has been recommended for boundary inclusion in all of the alternatives). This has led to the construction of a limited number of structures and roads and the loss of natural plant and animal habitat.

**Agricultural Activities.** Agricultural activities in the Dell City agricultural district contribute to windborne soil erosion and obscured visibility on the west side of the park.

#### **Current and Future Actions That Could Contribute to Cumulative Effects**

**Regional Population Growth.** Population has grown in the wider region, primarily in the urban areas of Midland-Odessa and El Paso. Population centers in the regional area represent a large percentage of park visitation. Increased park visitation could cause localized crowding at visitor facilities and degrade wilderness experiences and resource values on more popular trails.

**Subdivision Development.** Continuing 10-acre subdivisions and associated unregulated development on the west and south sides of the park (specifically in the Salt Basin and east of the Patterson Hills) will lead to the incremental construction of structures and roads. This will result in the loss of natural plant cover and animal habitat, increases in windborne particulates, and increased intrusions in the western escarpment viewshed.

**Mining and Drilling.** The Bureau of Land Management currently is preparing an environmental impact statement on natural gas development. Projects include pipelines

south of the park, and exploration and the installation of wells for natural gas and oil in the Otero Mesa and Crow Flats areas of New Mexico north and northwest of the park. Oil and gas exploration also is occurring on private lands in Texas south and east of the park. Concerns related to these activities increased air pollution and reduced visibility, both for daytime scenic vistas and the visibility of the night sky.

**Windmill Farms.** Wind energy generating towers along the Delaware Mountains could disrupt the park viewshed when approaching Guadalupe Pass from the west on U.S. Highway 62/180 and could adversely affect views from within the park.

**Potential Wind Energy Development.** Future installation of windmills on Texas General Land Office and other lands adjacent to the park could impact the movement of wildlife, including peregrine falcons and bighorn sheep, and also could impact scenic vistas.

**Water Exports.** There are proposals to export water from the Dell City aquifer and the aquifer immediately south of the park in Culberson County. Proposals to export water from these aquifers could dramatically lower groundwater tables and impact surface vegetation, soil stability, and water supplies available for local agricultural activities and for park use. Related development, roads, pipelines, and the proposed desalination plant could also impact park resources, alter ecosystems, and affect air quality and scenic vistas.

**Aircraft Overflights.** Military aircraft, primarily from Holloman Air Force Base but also from other bases, conduct training flights over and near the park. Pilots make overflights along many routes, but flights most often are near the park's western boundary in the Salt Basin and south of the park adjacent to the boundary. This flight training activity, consisting most frequently of low-flying, supersonic aircraft, is extremely loud. In addition to disrupting the activities of visitors and park staff, the noise

impacts wilderness and wildlife resource

**Surrounding Wilderness Areas.** There are wilderness study areas within Bureau of Land Management lands in the Brokeoff Mountains northwest of the park, in Bureau of Land Management lands northeast of the park, and in U.S. Forest Service lands on the northern boundary. Some of these study areas are adjacent to or less than 10 miles from new, controversial oil and gas exploration sites in the Otero Mesa and Crow Flats areas. Drilling activities and follow-on production could impact regional wilderness characteristics and values.

**Communication Towers.** Radio and microwave communication towers are located adjacent to the southeast park boundary on the ridge of the Delaware Mountains. There is the potential for more communication towers, especially cell phone towers, in this area and at other locations along the ridge. Towers cause impacts on the park viewshed from U.S. Highway 62/180 and from inside the park.

**Carlsbad Caverns National Park, New Mexico.** Actions at this park could affect regional archeological resources. Recent, current, or near-future actions at Carlsbad Caverns National Park include rehabilitation of the main park road; stabilization and preservation of several buildings, now used for maintenance, that date from the Civilian Conservation Corps era (1933 to 1942); and reconstruction of the visitor center.

Archeological surveys are performed prior to all such projects, and data retrieval is conducted in consultation with the state historic preservation officer if important archeological resources cannot be avoided.

**Lincoln National Forest, New Mexico.** No major development is anticipated in this national forest during the next five years. Ongoing projects include routine trail and road maintenance and the stabilization and preservation of several Civilian Conservation Corps era (1933 to 1942) buildings for future U.S. Forest Service maintenance purposes.

values.

**Commercial and Tourist Development.** *Blue Origin*, a Seattle-based company, is planning on developing a rocket launching facility about 30 miles south of the park. The installation will launch suborbital rockets that will take individuals into space and back, and will include rocket launchers and landing pads. This will likely cause indirect impacts by bring more development to the region and will add additional traffic (including hazardous materials) traveling through the park.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts of each alternative. The objective is to determine if they would have any additive effects on natural resources, cultural resources, visitor use, the socioeconomic environment, or NPS operations. Because some of these cumulative actions are in the early planning stages, the evaluation of cumulative effects was based on a general description of the project.

## METHODS FOR ANALYZING IMPACTS

The planning team based the impact analysis and the conclusions in this chapter largely on the review of existing literature and studies, information provided by experts in the National Park Service and other agencies, and Guadalupe Mountains National Park staff insights and professional judgment. The team's method of analyzing impacts is further explained below. All the impacts were assessed assuming that mitigating measures have been implemented to minimize or avoid impacts. If mitigating measures described in the "Alternatives, Including the Preferred Alternative" chapter were not applied, the potential for resource impacts and the magnitude of those impacts would increase.

*Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* presents an approach to identifying the duration (short-term, long-term, or permanent), type (adverse or beneficial), and intensity or magnitude (negligible, minor, moderate, or major) of impacts. That approach has been used in this document. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental impact statement.

Each alternative is compared to a baseline, represented by future conditions that would occur under the alternative of no action / continue current management (alternative A), to determine impacts. In the absence of quantitative data, best professional judgment was used to identify impacts.

Direct and indirect effects caused by an action were considered in the analysis. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects also are caused by the action, and although they may occur later in time or farther removed from the place, they are still reasonably foreseeable.

The impact analyses for the no action alternative compare resource conditions in the year 2022 to existing conditions in 2007, assuming continuation of current management direction. The impact analysis for the action alternatives (the preferred alternative and alternatives B and C) compare the action alternative in the year 2022 to the no action alternative in the year 2022. As a result, the impacts of each action alternative represent the *difference between* implementing the no action alternative and implementing that action alternative. To understand a complete "picture" of the impacts of implementing any of the action alternatives, the reader must also take into consideration the impacts that would occur under the no action alternative.

## CHANGES FROM THE DRAFT TO THE FINAL

### Impairment

Since the publication of the *Draft General Management Plan/EIS*, the National Park Service has changed where it addresses impairment of park resources. The impairment determination for this plan will now be located in the official *Record of Decision*, which is issued after the release of this *Final GMP/EIS*. Impairment determinations are not part of the NEPA process. Determinations of impairment are tied to the NPS Organic Act and relate directly to park resources and values, which do not include impact topics such as visitor experience, socioeconomics, public health and safety, environmental justice, land use, and park operations. With this change, references to impairment have been removed from this *Final GMP/EIS*, except in appendix C, where the NPS has provided responses to public comments on the impairment in the *Draft GMP/EIS*.

## Unacceptable Impacts

The analysis of unacceptable impacts in the *Draft GMP/EIS* was linked to the impairment analysis and has also been removed from this *Final GMP/EIS*. As with the impairment discussion, the only place in this document where unacceptable impacts are discussed is in appendix H, where the NPS has responded to public comments.

## NATURAL RESOURCES

Analysis of natural resources was based on research, knowledge of park resources, and the best professional judgment of planners, biologists, hydrologists, geologists, and paleontologists who have experience with similar types of projects. Information on the park's natural resources was gathered from state and local sources and park records. As appropriate, additional sources of data are identified under each impact topic heading.

Where possible, map locations of sensitive resources were compared with the locations of proposed developments and modifications. Predictions about short- and long-term site impacts were based on previous studies of visitor and facilities development impacts on natural resources. Sociological studies comparing the deterrent effects of signs versus ranger presence on sites were also considered in this analysis.

The impact threshold definitions below assume that mitigation would be implemented. For this document, the planning team qualitatively evaluated the impact intensity for natural resources.

### Soils

All available information on soils potentially impacted in various areas of the park was compiled. Where possible, map locations of sensitive soils were compared with locations of proposed developments and modifications of existing facilities. Predictions about short- and long-term site impacts were based on previous projects with similar soils and recent studies. The

thresholds of change for the intensity of an impact are defined as follows:

- **Negligible.** Soils would not be affected or the effects on soils would be below or at the lower levels of detection. Any effects on soils would be slight, and no long-term effects on soils would occur.
- **Minor.** The effects on soils would be detectable. Effects on soil area would be small. Mitigation might be needed to offset adverse effects and would be relatively simple to implement and likely to be successful.
- **Moderate.** The effect on soil would be readily apparent, would likely be long-term, and would result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
- **Major.** The effect on soil would be readily apparent and long-term, and would substantially change the character of the soils over a large area of the park. Mitigation measures to offset adverse effects would be needed and extensive, and their success could not be assured.
- **Duration.** Short-term: soil resources recover in less than three years. Long-term: soil resources require more than three years to recover.

### Plant Communities and Vegetation

All available information on vegetation and plant communities potentially impacted by the general management plan alternatives was compiled. Where possible, locations of sensitive vegetation species, populations, and communities were identified on maps and were avoided. Predictions about short- and long-term site impacts were based on previous projects with similar vegetation and recent studies. The thresholds of change for the intensity of an impact are defined as follows.

- **Negligible.** No native vegetation would be affected, or some individual native plants could be affected as a result of

implementing the alternative. However, there would not be any effect on native species populations. The effects would be on a small scale.

- **Minor.** Implementing the alternative would affect some individual native plants and would also affect a relatively minor portion of one or more species' populations. Mitigation to offset adverse effects could be required and would be effective.
- **Moderate.** Implementing the alternative would affect some individual native plants and would also affect a sizeable segment of one or more species' populations and over a relatively large area. Mitigation to offset adverse effects could be extensive but would likely be successful.
- **Major.** Implementing the alternative would have a considerable effect on native plant populations and would affect a relatively large area of the park. Mitigation measures to offset adverse effects would be required and extensive, and success of the mitigation measures would not be assured.
- **Duration.** Short-term: vegetation resources recover in less than three years. Long-term: vegetation resources require more than three years to recover.

### Wildlife

The Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the National Park Service to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise they are protected from harvest, harassment, or harm by human activities.

Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and

the ecological integrity of plants and animals. Information on the park's wildlife was taken from park documents and records. Information also was obtained from the park's natural resource management staff, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, and Texas Commission on Environmental Quality. The thresholds of change for the intensity of an impact are defined as follows:

- **Negligible.** There would be no observable or measurable impacts on native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
- **Minor.** Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any effects on native species populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- **Moderate.** Specific species are present during particularly vulnerable life-stages, such as breeding, juvenile stages, or migration. Mortality or interference with activities necessary for survival may be expected on an occasional basis, but would not threaten the continued existence of the species in the park. Impacts on species populations, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
- **Major.** Impacts on native species populations, their habitats, or the natural processes sustaining them would be detectable and outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species populations. Extensive mitigation measures would be needed to

offset any adverse effects, and their success would not be assured.

- **Duration.** Short-term: wildlife resources recover in less than three years. Long-term: wildlife resources require more than three years to recover.

### Geologic Resources

Congressional legislation that created the park specifically cites “outstanding geological values together with scenic and other natural values of great significance,” which establishes geological resources as a focal point for consideration of environmental impacts. Geological resources consist of both the geological features and the geological processes that continually modify the Earth’s surface and subsurface.

Published reports on geology, geological maps, and topographic maps were used to assess the importance of geological features and processes in various areas of the park. Park records were used to determine positions and importance of the park’s cave resources. Geologic and topographic maps and park records were especially used to compare with locations of proposed developments and modifications of existing facilities and infrastructure. Unless otherwise noted, impacts should be considered site-specific. The thresholds of change for the intensity of an impact are defined as follows:

- **Negligible.** The action could result in a change in a geologic process or feature, including a cave, but the change would be at the lowest level of detection, or not measurable. Mitigation measures would not be necessary.
- **Minor.** The action could result in a detectable change to a geologic process or feature, but the change would be slight and local. Mitigation might be used to offset adverse effects, but would be relatively simple to implement and likely successful.

- **Moderate.** The action would result in a clearly detectable change in geologic processes or features, or would affect a substantial area. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
- **Major.** The action would result in the permanent loss or substantial alteration of an important geologic process or feature that would be highly noticeable or would affect a large area. Mitigation measures to offset the adverse effects would be necessary and extensive and their success could not be guaranteed.
- **Duration.** Natural physical processes such as rock weathering, mass wasting, stream migration, dune formation, and the development of sinkholes and other features found in limestone formations, such as caves, are constantly impacting the geologic resources of the park. These processes are described in physical geology publications and the rate of change is strongly influenced by local environmental conditions. In the Guadalupe Mountains National Park environment, the change in geologic processes and features is largely driven by changes in temperature and the presence of water. Because the park is in an arid environment, the rate of change for the geologic features and processes is typically slow but is punctuated by catastrophic events such as flash floods.

Within the context of this general management plan, an issue is the increase in the rate of change in the geologic resources that is caused by activities in the park. For example, while erosion is a natural geologic process, the *rate* of erosion in some areas of the park could increase because of road and trail development or maintenance. These impacts could be at least partially mitigated but would still continue. Consequently, virtually all impacts on geological features or processes would be long-term.

### Paleontological Resources

Information from published reports on paleontology, geology, geologic maps, and field inspections was used to compile an assessment of the extent and distribution of paleontological resources in the park. In addition, a map predicting areas with a high potential for paleontological resources was created using these same resources.

The paleontological resources in the park are exposed and decay naturally through weathering processes. The process is generally very slow because of the hard Permian limestone formations that make up the Guadalupe Mountains. Although new fossils emerge as others are eroded away, the resources are not renewable. Impacts can be mitigated using a variety of measures, which include collecting and preserving fossils that might be lost or transported from their original context, onsite stabilization and preservation, molding and casting of in-place fossils, enhancement of partially exposed fossils, or avoidance where possible. However, certain types of microfossils are so abundant and widespread in the Permian limestone that mitigation measures would not be necessary. The thresholds of change for the intensity of an impact are defined as follows:

- **Negligible:** There would be no measurable impact to or loss of fossils because (a) the activity would occur in a geologic layer not known to contain extensive fossils and the volume of bedrock disturbance would be negligible, or (b) the activity would occur in a fossil-rich geologic layer, but the volume of bedrock disturbed would be nearly indiscernible. Monitoring would likely not detect fossils and the loss of fossils and/or associated contextual information would be minimal.
- **Minor:** A few fossils might be lost through illegal collecting, or there would be a low probability of effects from a ground-disturbing activity because (a) the activity would be in a geologic layer not known to contain extensive fossils, and the volume of bedrock disturbance would be large or (b) the activity would be in a fossil-rich geologic layer, but the volume of bedrock disturbed would be small. Most fossils uncovered probably would be found by monitoring, but some fossils and/or associated contextual information could be lost.
- **Moderate:** A number of fossils might be lost through illegal collecting, or there would be a moderate probability of effects from a ground-disturbing activity because (a) the activity would be in a geologic layer not known to contain extensive fossils, and the volume of bedrock disturbance would be large or (b) the activity would be in a fossil-rich geologic layer, but the volume of bedrock disturbed would be small. Most fossils uncovered probably would be found by monitoring, but some fossils and/or associated contextual information could be lost.
- **Major:** Many fossils could be lost through illegal collecting, or there would be a high probability of effects from a ground disturbing activity because the activity would be in a geologic layer of high fossil richness, and the volume of bedrock disturbance would be large. Even with monitoring, many fossils and/or associated contextual information probably would be lost.
- **Duration.** Duration for paleontological resources is always long-term. Any disturbance could affect *in situ* information (age and stratigraphy) and specimen relationships (ancient environment and ecology) and, thus, would not be subject to recovery to the original situation before disturbance, which is implied in short-term duration.



## CULTURAL RESOURCES

### Cultural Resources Listed, or Eligible to Be Listed, in the National Register of Historic Places

Potential impacts on cultural resources (archeological resources, prehistoric or historic structures, cultural landscapes, and traditional cultural properties) either listed in or eligible to be listed in the National Register of Historic Places were identified and evaluated in accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act (36 *Code of Federal Regulations* 800, "Protection of Historic Properties"): by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are national register - listed or -eligible; (3) applying the criteria of adverse effect to affected resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of *adverse effect* or *no adverse effect* must be made for affected national register-listed or -eligible cultural resources. An *adverse effect* occurs whenever an action alters directly or indirectly any of the characteristics of a cultural resource that qualify it for inclusion in the national register, i.e., diminishing the integrity (the extent to which a resource retains its historic appearance) of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 *Code of Federal Regulations* 800.5(a)(1)). A determination of *no adverse effect* means there is an effect, but the effect would not meet the criteria of adverse effect (36 *Code of Federal Regulations* 800.5(b)).

In this general management plan, the criteria for characterizing the severity or intensity of

impacts on national register-listed or -eligible archeological resources, prehistoric or historic structures, and cultural landscapes (there are no cultural resources that are designated as traditional cultural properties in Guadalupe Mountains National Park) are the Section 106 determinations of effect: *adverse effect* or *no adverse effect*.

### Ethnographic Resources and Museum Collections

Ethnographic resources that are not traditional cultural properties and museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens), which are generally ineligible for listing in the national register, are not subject to Section 106 of the National Historic Preservation Act. In this general management plan, potential impacts on ethnographic resources and museum collections are described in terms of context (are the effects site-specific, local, or regional?), duration (are the effects short-term, lasting less than a year; long-term, lasting more than a year; or permanent?) and intensity (is the degree or severity of effects negligible, minor, moderate, or major?). The definitions of impact intensity for museum collections and ethnographic resources follow:

#### Ethnographic Resources.

- **Negligible:** Impact would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the associated group's body of practices and beliefs.
- **Minor:** Adverse impact — would be slight but noticeable but would neither appreciably alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the associated group's body of practices and beliefs.

Beneficial impact — would allow access to and/or accommodate a group's traditional practices or beliefs.

- **Moderate:** Adverse impact — would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the associated group's practices and beliefs, even though the group's practices and beliefs would survive. Beneficial impact — would facilitate traditional access and/or accommodate a group's practices or beliefs.
- **Major:** Adverse impact — would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the resource and the associated group's body of practices and beliefs, to the extent that the survival of a group's practices and/or beliefs would be jeopardized. Beneficial impact — would encourage traditional access and/or accommodate a group's practices or beliefs.

#### Museum Collections.

- **Negligible:** Impact is at the lowest levels of detection. It is barely measurable with no perceptible consequences, either adverse or beneficial, on museum collections.
- **Minor:** Adverse impact — would affect the integrity of a few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation. Beneficial impact — would stabilize the current condition of the collection or its constituent components to minimize degradation.
- **Moderate:** Adverse impact — would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

Beneficial impact — would improve the condition of the collection or protect its constituent parts from the threat of degradation.

- **Major:** Adverse impact — would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation. Beneficial impact — would secure the condition of the collection as a whole or its constituent components from the threat of further degradation.

#### VISITOR EXPERIENCE AND UNDERSTANDING

In assessing impacts related to interpretation, factors such as participation rates, quality, importance, and communication effectiveness should be considered. The following definitions were developed to describe the thresholds of change for the intensity of an impact on visitor experience or understanding.

- **Negligible:** Changes in visitor use and the visitor experience would not occur or would not be detectable. There would not be any noticeable change in visitor experience or in defined indicators of visitor satisfaction or behavior.
- **Minor:** Changes in visitor use and/or experience would be small but detectable. Visitors could be aware of the effects, but the changes would not appreciably alter critical characteristics of the visitor experience, visitor satisfaction, or levels of park use.
- **Moderate:** Some changes in characteristics of the park experience would be readily apparent, or the number of visitors engaging in an activity or in the use of the park would be substantially altered. Most visitors would be aware of changes, and many would be able to express an opinion regarding the difference. Visitor

satisfaction would change as a result of the impact.

- **Major:** Changes in multiple critical characteristics of the desired experience would be readily apparent. Most visitors would be aware of the effects and would likely express a strong opinion about the changes. Participation in desired experiences or in park visitation would be considerably altered, and would result in substantial changes in the defined indicators of visitor satisfaction or behavior.
- **Duration.** Short-term: the impact is temporary and occurs for less than one year. Long-term: impact occurs for more than one year.

## THE SOCIOECONOMIC ENVIRONMENT

The analysis of effects of the alternatives on the socioeconomic environment considered the magnitude, intensity, and duration of consequences, as well as the context (local, park, regional) of the impact. The primary events or actions in the alternatives that could trigger socioeconomic impacts include

- construction expenditures
- changes in NPS staffing and annual operating and maintenance expenditures
- changes in the number, activity patterns, or locations of park visitation
- changes in business opportunities associated with the park's management emphasis

Socioeconomic impacts were based on a qualitative analysis of potential changes. Factors included the relative magnitude, timing, and (where appropriate) location. The impacts of those changes were then determined based on those descriptors, insight, and judgment. More detailed, quantitative analysis will be completed as part of the implementation process. The thresholds of change for the intensity of an impact are defined as follows:

- **Negligible.** Effects on population, economic activity, housing, community infrastructure, public sector fiscal conditions, local governance and social institutions, or quality of life would be below detectable levels, or detectable only through indirect means, and would result in no discernible effect on the character of the affected social and economic environment.
- **Minor.** Effects on population, economic activity, housing, community infrastructure, public sector fiscal conditions, local governance and social institutions, or quality of life would be detectable but localized in geographic extent or size of population affected and would not be expected to alter the character of the established social and economic environment.
- **Moderate.** Effects on population, economic activity, housing, community infrastructure, public sector fiscal conditions, local governance and social institutions, or quality of life would be readily detectable across a broad geographic area or segment of the community and could have an appreciable effect on the social and economic environment.
- **Major.** Effects on population, economic activity, housing, community infrastructure, public sector fiscal conditions, local governance and social institutions, or quality of life would be readily apparent, affect a substantial segment of the population, extend across the entire community or region, and likely have a noticeable influence on the social and economic environment.
- **Duration.** Short-term: impacts that are temporary in nature, for example jobs supported by construction activity, and those anticipated to endure for five years or less. Long-term: impacts extending beyond five years.

## PARK OPERATIONS, FACILITIES, AND EQUIPMENT

The impact analysis evaluated the effects of the alternatives on the following aspects of park operations:

- management, administration, and staffing
- infrastructure, including employee housing, maintenance, and visitor facilities

Only the impacts related to new activities, those likely to undergo major operational changes, or those that are likely to increase or decrease in the level of activity are included in the analysis. Most daily and programmatic activities are likely to have negligible effects, that is, there would not be measurable change in or difference in park operations. These activities are generally not included in the analysis. The analysis is more qualitative than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact.

- **Negligible.** Park operations would not be affected or the effect would be at or below detectable levels and would not have an appreciable effect on park operations.
- **Minor.** The effects would be detectable, but would be of a magnitude that would not have an appreciable effect on park operations.
- **Moderate.** The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public.
- **Major.** The effects would be readily apparent, would result in a substantial change in park operations in a manner noticeable to staff and the public, and would be markedly different from existing operations.
- **Duration.** Short-term impacts would be less than one year. Long-term impacts would extend beyond one year and have a permanent effect on operations or facilities.



Looking Down El Capitan Trail

## ALTERNATIVE A: NO ACTION

### NATURAL RESOURCES

#### Soils

Developed areas in the park that are currently disturbing soils include Pine Springs, Frijole Ranch, McKittrick Canyon, Ship-on-the-Desert, Williams Ranch, and Dog Canyon. Existing facilities causing impacts on soils include roads, parking areas, trails, campgrounds, picnic areas, buildings, footbridges, utility systems (water, wastewater, and the overhead power lines at McKittrick Canyon), and corrals.

Alternative A would result in ongoing soil disturbance caused by the use of these facilities. Ongoing soil disturbances also would result from maintenance activities such as trail and road grading, road resurfacing, repairing buildings, and maintaining the water and wastewater systems. These ongoing actions would be restricted to small areas that previously had been disturbed. Sites with soil disturbance would continue to have accelerated wind and water erosion, at least temporarily, until soils were stabilized through mitigation or natural processes. Collectively, disturbances from ongoing use and maintenance of park facilities would have minor, adverse, long-term impacts on the soil resource.

Hiker and horse traffic on trails would continue to compact soils, decrease permeability, alter soil moisture, and diminish water storage capacity.

Collectively, these actions would increase erosion and change the composition of vegetation. Altered vegetative composition would create changes in soil chemistry. Because of the relatively small areas involved, the intensity of the long-term, adverse impacts would be minor.

To minimize the soil erosion associated with foot traffic, most visitor developments have been constructed where slopes are less than

15 percent. Trails were constructed to minimize impacts on soils by concentrating hikers on a maintained surface, with water and erosion control measures to mitigate impacts. Visitors are encouraged to stay on trails, especially in more heavily used areas. Ongoing trail rehabilitation would continue to include design methods of mitigation in areas where the slope is high and soils are easily eroded by wind and water. These impacts have already occurred to some degree because all of the areas involved have been disturbed. Ongoing soil erosion by wind and water and soil nutrient transport would cause minor, long-term, adverse impacts.

Past development has wholly or partly eliminated the direct inflow of water, such as Manzanita Spring; has created impervious surfaces, such as building roofs and paved roads; and has diverted precipitation from some natural drainages. In addition, soils that have been compacted have reduced rates of water infiltration. To minimize or mitigate these adverse impacts, the National Park Service would continue to implement management actions such as visitor education on the impacts of off-trail use, site hardening or trail paving, placement of fences to direct visitor use, designated trails and campsites, and the restoration of impacted sites as funding was available. Most impacts have already occurred in the developed areas; consequently, impacts would continue to be minor, long-term, and adverse.

Soils of the two NPS-owned parcels of land proposed for addition to the park (near the southern boundary) would be protected from development. Because the area within the two parcels would continue to be protected from development, there would be no new human-caused impacts on soils.

**Cumulative Effects.** Past actions that have impacted soil resources outside the park include development and use of roads and

trails, subdivision developments, mining and drilling, and the installation of structures such as communication towers and power lines. Soils also have been disturbed or altered by cutting and filling; removing or adding soil; tilling, grazing, and other agricultural practices; and covering with impermeable surfaces.

Agriculture, especially dryland farming and ranching, has led to the erosion of soils by removing native vegetation and replacing it with plants not necessarily suited to the desert environment. This, along with tilling the soil, has left soils exposed to erosion by wind and water.

Current and future projects that would affect soils outside the park include regional population growth and development to support that growth, subdivision developments, mining and drilling, and windmill farms in and near the Delaware Mountains.

These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on soil resources.

Within Guadalupe Mountains National Park, if efforts to restore soils and natural hydrologic processes at specific areas were successful, there would be long-term, beneficial impacts on soils at those locations. Locally, soil restoration projects in the park would have beneficial impacts, and the regional impact would be negligible because of the small areas involved.

The effects on regional soil resources caused by past, current, and foreseeably future practices, in conjunction with the impacts of alternative A, would be moderate to major, long-term, and adverse. Most of the impacts would be the result of development actions outside the park that might or might not be mitigated. The actions associated with alternative A would have a negligible long-term contribution to these cumulative impacts on soil resources.

**Conclusion.** Soil disturbance from ongoing use and maintenance of park facilities would

have minor, adverse, long-term impacts. Trail use and its related soil erosion would result in minor, long-term, adverse impacts. Impacts of past development, such as the creation of impervious surfaces, the diversion of precipitation from natural drainages, and the compaction of soils, would continue to be long-term, adverse, and minor.

Regionally, cumulative impacts on soils would be moderate to major, long-term, and adverse. This alternative's contribution to these effects would be negligible.

### Plant Communities and Vegetation

Developed areas in the park that are currently disturbing plant communities and vegetation include Pine Springs, Frijole Ranch, McKittrick Canyon, Ship-on-the-Desert, Dog Canyon, and Williams Ranch. There would be ongoing plant community and vegetation disturbance caused by the use of roads, parking areas, trails, campgrounds, picnic areas, buildings, footbridges, utility systems, corrals. Vegetation disturbances also would result from maintenance activities such as trail and road grading, road resurfacing, revegetation, exotic species control, native species reintroduction, repair of buildings, and maintenance of water and wastewater systems. Some plants would continue to be killed from the exposure of root systems, trampling, and removal. Plant death would continue to impact plant communities by changing the relative abundance of species and resultant species composition. Because most of these activities would continue to occur over small areas that have been previously disturbed, this would be a continuing negligible to minor, long-term, adverse impact.

The irrigation of shade trees and lawns at the Frijole Ranch would continue to cause the growth of unnaturally lush vegetation and would allow exotic species to flourish. This would be an ongoing, minor to moderate, long-term, adverse impact.

Management of Manzanita Spring would not change. The spring would be dredged periodically to remove accumulated sediment and maintain an open pond. This would result in a negligible impact on existing plant communities and vegetation.

The two NPS-owned parcels of land proposed for addition to the park near the southern boundary would continue to be excluded from development. Because none of the area within the two parcels would be impacted by development, there would be no new human-caused impacts on vegetation.

Lands outside the park boundary that are considered critical to protecting important park-related resources, including habitat for important species of plants, might be acquired from willing sellers or through donation, or could be protected through agreements or easements. If this occurred, there would be long-term, beneficial impacts on these resources.

**Cumulative Effects.** Past actions that have impacted vegetation resources outside the park include development and use of roads, trails, subdivision developments, U.S. Highway 62/180, mining and drilling, communication towers, and power line installation. Vegetation communities and individual plants have been disturbed or altered by soil cuts and fills; soil removal or addition; soil loss through agricultural practices of farming, ranching, and plowing; and soil covering with impermeable surfaces.

Agriculture, especially, including dryland farming and ranching, has led to the erosion of soils by removing native vegetation and replacing it with plants not necessarily suited to the desert environment. Agriculture has, thus, greatly reduced the abundance and diversity of native desert plants outside the park. Plants have been affected by being killed and displaced, and habitat has been lost through agricultural uses and introduction of nonnative plants. This, along with tilling the soil, has disrupted vegetative

communities and caused substantial vegetative changes.

The development of some private lands outside the park for residential, commercial, tourist-related, or other uses, and the construction of structures in the park, has increased runoff, wind erosion, social trails, and soil compaction and has altered soil regimes. As a result, soils are less able to support vegetative growth or the establishment of new or replacement vegetation.

These actions have resulted and could continue to result in long-term, moderate to major, adverse impacts on vegetative resources. The actions of alternative A would contribute a very small increment to the cumulative impacts.

**Conclusion.** Maintenance and ongoing visitor use would continue to have negligible to minor, long-term, adverse effects on vegetation. Continued irrigation of shade trees and lawns at the Frijole Ranch would encourage non-native species, a minor to moderate, long-term, adverse impact. The proposed boundary change would have negligible impacts on vegetation, and beneficial impacts could result from arrangements that protected vegetation and plant communities outside the park.

The cumulative impacts on vegetation would continue to be long-term, moderate to major, and adverse. This alternative's contribution to these effects would be very small.

### **Wildlife**

There would be no change in the amount of wildlife habitat or its quality in the park under the no action alternative. Development would continue to occupy less than 1,000 acres or a little more than 1 percent of the 86,416 acres in the park.

Developed areas in the park that are currently disturbing wildlife, wildlife movement, and wildlife habitat include Pine Springs, Frijole Ranch, McKittrick Canyon,

Ship-on-the-Desert, and Dog Canyon. Existing facilities causing impacts on wildlife, wildlife movement, and wildlife habitat loss and fragmentation include roads, parking areas, trails, campgrounds, picnic areas, buildings, footbridges, utility systems, and corrals. Impacts are also continuing because of ongoing maintenance activities, such as trail and road grading, road resurfacing, revegetation, exotic species control, native species reintroduction, repair of buildings, and maintenance of water and wastewater systems.

Many wildlife species are disturbed by the presence of people and developments. In addition, herbivores are adversely affected by the removal of vegetation that they use for habitat, cover, and food, while predators are adversely affected by the lack of habitat, cover, and prey species.

With the implementation of alternative A, people would continue to concentrate at developed areas intended for public and administrative use, disturbing wildlife and degrading habitat at those sites and along the trails to and from those sites. Developments themselves, regardless of how far apart they are spaced, contribute to habitat fragmentation, and roads fragment habitat and movement by some animals. Some wildlife species, such as coyotes, deer, rodents, and some birds, have long been acclimated to humans and human developments and may benefit from developments, while other species avoid such areas. Considering the large acreage of the park, the small percent of the park's wildlife habitat that has been developed, and the fact that many wildlife species have become habituated to humans and human developments, these impacts would be adverse and long-term and the intensity would be negligible to minor.

Visitors to less-used sites, such as backcountry camping areas and wilderness, would continue to cause intermittent disruption of wildlife movement and

behavior. This adverse impact would be minor and long-term.

Vehicle traffic would continue to cause a relatively low incidence of collisions with wildlife, resulting in road kill. This would result in a minor, long-term, adverse impact on wildlife.

The two NPS-owned parcels of land proposed for inclusion in the park boundary near the southern boundary would be excluded from development. Because none of the area within the two parcels would be impacted by development, there would be no new human-caused impacts on wildlife.

Lands outside the park boundary that are considered critical to protecting important park-related resources, including habitat for important species of animals, could be acquired from willing sellers or through donation, or could be protected through agreements or easements. If this occurred, there would be long-term, beneficial impacts on these resources.

**Cumulative Effects.** Past actions that have impacted wildlife outside the park include vegetation clearing, development and use of roads and trails, subdivision developments, U.S. Highway 62/180, mining and drilling, communication towers, and power line installation. Wildlife have been disturbed, killed, and forced to relocate by various development actions including agriculture, introduction of exotic species, hunting, trapping, collisions with vehicles on highways, and vermin control. Wildlife continues to be disrupted by development and human activity.

The development of some private lands adjacent to the park for residential, commercial, tourist-related, or other uses, and the construction of facilities in the park has adversely affected wildlife habitat and habits and has caused the loss of wildlife in some areas. Water use at these developments could reduce water available for wildlife. Road kill would increase because more



development probably would increase traffic.

The current effect on wildlife caused by past practices of agriculture and ranching covers wide areas and is adverse. Impacts on wildlife of current and anticipated future actions outside the park, in conjunction with the impacts of the no action alternative, would be cumulative, moderate to major, long-term, and adverse. Most of the impacts would be the result of development actions outside the park. The actions proposed in alternative A would contribute only very slightly to these cumulative impacts on wildlife resources.

**Conclusion.** Activities associated with the use and operation of the park would continue to have long-term, negligible to minor, adverse impacts on wildlife. Collisions of vehicles with wildlife would continue to have in a minor, long-term, adverse impact on wildlife. The proposed boundary change would have negligible impacts on wildlife, and beneficial impacts could result from arrangements that protected wildlife resources outside the park.

The cumulative impacts on wildlife would be moderate to major, long-term, and adverse. This alternative's contribution to these effects would be very small.

### **Geological Resources**

Geologic processes continually modify the features and resources within the park. Some changes are obvious (such as rock weathering), and others (such as stream migration) may be more subtle. Alternative A would have negligible impacts on such geologic processes as rock weathering, mass wasting, dune formation, and the development of sinkholes.

Alternative A would have long-term implications relating to changes in the flow of water in the desert environment. Some park activities, such as trail and infrastructure development and

maintenance, could impact geologic processes by, for example, increasing erosion rates or diverting or channeling natural runoff. The impacts of development and maintenance activities can be partially mitigated by best management practices such as constructing water bars to facilitate trail drainage while minimizing erosion, or by installing silt fencing at construction sites to reduce sedimentation of water bodies. Consequently while the impacts on geologic processes from these activities would continue to be long-term and adverse, the intensity would be negligible to minor.

Changes in geologic processes relating to water could continue to impact other park resources. Trails and other types of construction could change natural runoff patterns, which could cause changes to recharging aquifers or could alter the flow regime of ephemeral streams in the park. These changes could in turn impact the vegetation and wildlife that depend on the stream in this arid region. While these impacts would continue to be adverse and long-term, the intensity would be minor because of the small areas involved and the ongoing park maintenance and mitigation (such as rerouting of problem trail segments) that prevents serious problems from developing.

The park would continue to require that all visitors to caves have a permit for safety and management purposes. Potential adverse impacts on the geologic resources in the caves include compaction of the cave floor, intentional and inadvertent breaking of cave formations, and scuff marks on the cave walls. At the current low level of visitation, the adverse impacts on the caves would continue to be negligible over the long term.

There are three areas in the park that contain the reference stratotype for a particular geologic formation. Potential impacts from theft or vandalism would continue to be limited by the remote locations of these areas, and the adverse, long-term impacts would remain negligible. Individuals who

have obtained a permit from the park can collect samples from the reference stratotype areas for research purposes. Currently, the number of permits issued each year is low, and the adverse impacts of continuing this system would be negligible to minor and long-term. Because these resources are nonrenewable, ongoing monitoring would be required to ensure that the aggregate impact from visitors and researchers would not increase.

Two sections of NPS-owned land outside the park's legislated boundary contain rare exposures of geological formations. One exposure is the official reference stratotype for the formal rock unit, the Pipeline Shale Member of the Brushy Canyon Formation. Gas and petroleum pipeline rights-of-way cut through this section and are responsible for exposing some of the classic outcroppings. This management plan proposes a boundary change to include these NPS-owned areas in the park. Current management activities include documentation and monitoring of the condition of the rock unit. The park staff is working cooperatively with the pipeline companies to minimize any impacts on the formations from pipeline construction and maintenance. Currently the impacts on the geological formations in these sections are adverse, negligible, and long-term.

Lands outside the park boundary that are considered critical to protecting important park-related resources, including groundwater, the Salt Basin Dunes, and type localities for geologic resources, could be acquired from willing sellers or through donation, or could be protected through agreements or easements. If this occurred, there would be long-term, beneficial impacts on these resources.

**Cumulative Impacts.** Past actions that have impacted geologic resources outside the park include development and use of roads and trails, subdivision developments, U.S. Highway 62/180, mining and drilling, communication towers, power line

installation, and use of some caves. Geological resources have been disturbed or altered by cuts and fills; soil removal or addition; soil loss (thus exposing geologic resources) from agricultural practices of farming, ranching, and plowing; drilling or removal through mining; and covering with impermeable surfaces.

Current and future projects that would affect geological resources outside the park include regional population growth and development to support that growth, subdivision developments, mining and drilling, and windmill farms in and near the Delaware Mountains.

Long-term, adverse impacts on the near-surface geology from these developments have been localized and range in intensity up to moderate. Cumulative impacts from these developments on geologic formations that are more than 50 feet from the surface have been negligible. The actions proposed in alternative A would contribute only very slightly to near-surface cumulative impacts on geologic resources and would have negligible effects on deeper formations.

**Conclusion.** Long-term, adverse impacts of negligible to minor intensity would result from continued park operation, particularly from the use and maintenance of trails. Long-term adverse impacts would continue to be negligible for caves and negligible to minor for the three areas of geologic formation reference stratotypes. The proposed boundary change would have negligible impacts on geology, and beneficial impacts could result from arrangements that protected geological resources outside the park.

The cumulative impacts on near-surface geologic resources would be long-term and adverse, and locally could be of moderate intensity. This alternative's contribution to these effects would be very small.

## Paleontological Resources

Current park facilities, including roads, parking lots, and buildings are not sited on areas that would adversely impact paleontological resources.

About 18 miles of the park's 82 miles of trails extend across areas identified as having high potential for paleontological resources. This is an area equivalent to about 11 acres of the total estimated 27,000 acres of the park having a high potential for paleontological resources. Trail construction and maintenance has had both adverse and beneficial effects on these resources. The initial blasting and rubble clearing had an adverse impact, as does ongoing trail maintenance when rock is removed from the tread and banks, because these activities can damage fossils. Mitigation measures would include collection and *in situ* stabilization. Erosion along trails and informal (or social) trails can also damage exposed fossils. These impacts are adverse, minor, and long-term.

Horses impact fossils in park trails because horseshoes grind away the limestone that composes the fossils and rocks. Because of the limited area involved, the impacts are adverse, minor, and long-term.

There are indirect beneficial impacts associated with activities that expose fossils in the park. Because the Permian limestone is hard, the weathering processes that break down fossils act slowly. The ability to see intact fossils *in situ* is beneficial for both research and visitor interpretation and supports the mission and purpose of the park.

The fossils found in the caves are from the Pleistocene and are relatively young, ranging in age from 10,000 to 30,000 years old. Typically, the fossils are buried in the cave floors after falling or washing into the cave with other sediments. Potential impacts on the fossils from visitors include compaction of the cave floor, intentional or inadvertent damage to the fossils, and theft. Currently, cave access is restricted, which limits the

long-term, adverse impacts on the paleontological resources to minor.

Within the park there are at least 22 type fossil localities. These areas could be adversely impacted by inadvertent or intentional destruction of the fossils or by theft. Access to these areas is difficult and not always along trails, so the long-term, adverse impacts of continuing current management would be minor.

The two sections of NPS-owned land proposed for inclusion in the park boundaries are locations of rare exposures of geological formations. Several important, historically documented and currently producing paleontological localities occur in these sections. Gas and petroleum pipeline rights-of-way cut through one of these sections. Current management activities of fossil localities away from the right-of-way include documentation and monitoring to prevent losses to the paleontological resources by erosion. The park is working cooperatively with the pipeline companies to minimize impacts on the formations from pipeline construction and maintenance. Currently, the impacts on the reference units are adverse, minor, and long-term.

Lands outside the park boundary that are considered critical to protecting important park-related resources, including paleontological sites and type localities for fossils, could be acquired from willing sellers or through donation, or could be protected through agreements or easements. If this occurred, there would be long-term, beneficial impacts on these resources.

**Cumulative Impacts.** The effects on paleontological resources caused by past practices cover wide areas and are adverse. These impacts include exposure, damage, or destruction of paleontological resources, and the damage or destruction of important scientific context or other information. Past actions that have caused these effects outside the park include development and use of roads and trails, subdivision developments, U.S. Highway 62/180, mining

and drilling, communication towers, power line installation, and allowing use of some caves. Paleontological resources have been disturbed or altered by cuts and fills; soil removal or addition; soil loss (thus exposing paleontological resources) through agricultural practices of farming, ranching, and plowing; and drilling or removal through mining.

Other past actions that have impacted paleontological resources outside the park include development and use of the Carlsbad Caverns and Lechuguilla Cave. Many areas in Carlsbad Caverns are developed for extensive visitor use and include trails, restrooms, dining facilities and souvenir stand, electrical lines and lighting, and elevators. Lechuguilla Cave remains undeveloped and is accessed rarely and only for valid scientific study.

Current and future projects that would affect paleontological resources outside the park include regional population growth and development to support that growth, subdivision developments, mining and drilling, and windmill farms in and near the Delaware Mountains.

Despite the widespread occurrence of long-term, adverse impacts, effects on paleontological resources in near-surface locations and in caves from these developments have been localized and the intensity typically has been no more than moderate. Cumulative impacts from these developments on paleontological resources that are more than 50 feet from the surface (other than those in caves) have been negligible. The actions proposed in alternative A would contribute only very slightly to cumulative impacts on paleontological resources in the near-surface and in caves, and would have negligible effects on deeper resources.

**Conclusion.** Adverse, minor, long-term impacts on park paleontological resources would continue to occur because of hiking trail use, trail use by horses, use of caves, and access to type fossil localities. Indirect

beneficial impacts would result from activities that exposed fossils in the park for research and visitor interpretation. The proposed boundary change would have negligible impacts on paleontological resources, and beneficial impacts could result from arrangements that protected paleontological resources outside the park.

The cumulative impacts on near-surface and cave paleontological resources would be long-term and adverse, and locally could be of moderate intensity. This alternative's contribution to these effects would be very small.

## CULTURAL RESOURCES

### Archeological Resources

Archeological resources adjacent to or easily accessible from trails or picnic, camping, and parking areas, as well as archeological resources in the park's caves that are accessible by permit to visitors, would be vulnerable to surface disturbance, inadvertent damage, and vandalism. A loss of surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence could result. Continued ranger patrol and increased emphasis on visitor education would help discourage inadvertent destruction of cultural remains and vandalism, and few if any adverse effects would be anticipated. However, sites or areas with archeological resources that are subject to continued degradation could be closed to visitor access to better protect the resources.

Implementation of this alternative would result in continued routine trail maintenance, which could include limited rerouting of problem trail segments to improve resource protection. Archeological surveys would precede any ground disturbance associated with the reconstruction of trail segments. In addition, archeological surveys or monitoring would occur, as appropriate, during the reseeding and/or revegetation of trail segments being

rehabilitated to natural conditions. Because national register-listed or -eligible archeological resources would be avoided to the greatest extent possible, no adverse effects on archeological resources would be anticipated. If, however, significant archeological resources could not be avoided during trail construction, the effects on such resources would be adverse. A memorandum of agreement, in accordance with 36 *Code of Federal Regulations* Part 800.6, "Resolution of Adverse Effects," would be negotiated between Guadalupe Mountains National Park, the Texas state historic preservation officer, and, if necessary, associated American Indians. The memorandum of agreement would stipulate how the adverse effects would be mitigated.

**Cumulative Impacts.** Past development in the park and the planned construction of subdivisions along the park's southern and western borders (some grading has been done along the western border) might have had adverse effects on archeological resources during excavation and construction activities. In addition, cattle grazing both inside and outside the park might have had adverse effects on archeological resources.

Reasonably foreseeable future actions occurring throughout the region include cattle grazing, continued subdivision development, natural gas and oil exploration and development, and the construction of windmill farms and communication towers. These actions could disturb archeological resources outside the park's boundaries. Impacts on national register-eligible or -listed archeological resources that could not be avoided would be adverse effects.

Because national register-listed or -eligible archeological resources within the park would be avoided to the greatest extent possible during implementation of alternative A, the actions associated with the alternative would contribute only minimally to the adverse effects of other past, present, or reasonably foreseeable actions. Any

adverse effects on archeological resources resulting from implementation of alternative A would be a very small component of the cumulative adverse impact.

**Conclusion.** Avoidance of national register-listed or -eligible archeological resources during the repair of trail segments would result in no adverse effects on archeological resources. Few if any adverse effects would result from inadvertent disturbance or vandalism.

The cumulative impacts on archeological resources would result in adverse effects. This alternative's contribution to these effects would be very small.

### Historic Structures

To appropriately protect the park's national register-listed or -eligible historic structures, including remnant historic ranching structures in the backcountry or wilderness, all stabilization and preservation as well as daily, cyclical, and seasonal maintenance would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, and 1995b). There would be no adverse effects on the park's historic structures as a result of any stabilization or preservation efforts.

Past visitor use patterns at Guadalupe Mountains National Park have put some historic structures at risk from visitor activities. For example, unsupervised children have dislodged stones from the remnant limestone walls of the Pinery, and signs of wear on the linoleum floor covering at the schoolhouse of the Frijole Ranch led to changes in how visitors access the ranch. Historic structures accessible to visitors, including the Pinery, Frijole Ranch, Pratt Cabin, and Williams Ranch, would continue to experience wear and tear from increased visitation, and unstaffed or minimally staffed structures could be more susceptible to vandalism.

Visitors in backcountry and designated wilderness areas could encounter remnant

historic structures of past ranching activities, such as metal and concrete water storage tanks and metal pipelines. Continued ranger patrol and increased emphasis on visitor education would help discourage vandalism and inadvertent damage of historic fabric. Monitoring the carrying capacity of historic structures that visitors are allowed to enter could result in the imposition of management actions that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Historic structures subject to continued degradation could be closed to visitor access to better protect the resources. As a result, few if any adverse effects would be anticipated.

**Cumulative Impacts.** Reasonably foreseeable future actions occurring throughout the region include continued subdivision development, natural gas and oil exploration and development, and the construction of windmill farms and communication towers. These actions would have no potential to affect historic structures in the park but could have adverse effects on historic structures outside the park.

As described above, implementation of alternative A would result in few if any adverse effects on the park's historic structures. Yet, because of the adverse impacts of other past, present, or reasonably foreseeable actions, cumulative impact would result in adverse effects. Any adverse impacts contributed by alternative A to the cumulative impacts would be a very small component of the adverse cumulative impact.

**Conclusion.** Few if any adverse effects would be anticipated from implementing alternative A.

Cumulative impacts on historic structures would result in adverse effects. This alternative's contribution to these effects would be very small.

## Cultural Landscapes

The current rehabilitation of the Frijole Ranch house's cultural landscape is being undertaken in accordance with the cultural landscape report (NPS 1995a) prepared for the property. There would be no adverse effects associated with rehabilitation of the property.

No further changes to the cultural landscapes of the national register-listed Frijole Ranch or the Pinery are proposed. To appropriately preserve and protect the landscapes, all stabilization and preservation efforts would continue to be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, 1995b). No adverse effects would be anticipated.

The research necessary to determine the national register eligibility of each of the park's 10 potential cultural landscapes is a prerequisite for establishing the significance and identifying the character-defining features of the landscapes, as well as the basis of informed decision making in the future regarding how the landscapes should be managed. Such research would precede the construction of any trails or trail segments that could potentially alter the character-defining features (spatial organization, topography, vegetation, circulation features, and land use patterns) of the landscapes. As a result, no adverse effects would be anticipated.

**Cumulative Impacts.** Over the years, cultural landscapes in the park have been adversely affected by erosion, development, and visitor use. Outside the park, ongoing and reasonably foreseeable future actions include development of the Guadalupe Mountains Estates subdivision along the park's southern and western borders, natural gas and oil exploration and development, and the construction of windmill farms and communication towers. These actions have the potential to disturb cultural landscapes. Impacts on national register-eligible cultural landscapes that

could not be avoided could be adverse, depending on the scope of the potential actions and the character-defining features and/or landscape patterns affected.

Because of the adverse impacts of other past, present, or reasonably foreseeable actions, the cumulative impact would be adverse. Alternative A would not contribute any adverse impacts to the cumulative adverse impact.

**Conclusion.** Implementation of alternative A would result in no adverse effects on the park's cultural landscapes.

Cumulatively, there would continue to be adverse effects on the region's cultural landscapes. This alternative would contribute a very small increment to these cumulative impacts.

### **Ethnographic Resources**

Visitors could intrude on Mescalero Apache or Tigua Indians of Ysleta del Sur Pueblo individuals observing sacred rituals or seeking solitude to practice traditional beliefs. However, visitor access to the ridge of the Guadalupe Mountains and to the slopes of the western escarpment would continue to remain remote and regulated by special permit, and adverse impacts on Mescalero or Tigua practitioners resulting from the distraction of inadvertent visitor encounters would be minor.

Visitation at McKittrick Canyon and Manzanita Spring could also be potentially disruptive to Mescalero traditional use in those areas. Adverse impacts on Mescalero traditional use would be minor.

It is the understanding of the National Park Service that the Tigua Indians of Ysleta del Sur Pueblo would prefer that visitors not be allowed into the gypsum sand dunes. Impacts on Tigua sensitivities from continued visitation of the sand dunes would be moderate, adverse, and long-term.

Visitors using the rest stop off U.S. Highway 62/180 would continue to be able to observe

the image of Our Lady of Guadalupe (part of El Capitan rock formation). Because there would be no change, there would be negligible impacts on traditional Hispanic viewing of this ethnographic resource.

Continued American Indian consultations between the park staff and the Mescalero Apache Tribe and the Tigua Indians of Ysleta del Sur Pueblo could result in the sharing of knowledge about indigenous plants that would lead to better resource management of certain plants in the park. Impacts from increased park staff knowledge would be beneficial and long-term.

**Cumulative Impacts.** Within the park, minor to moderate, long-term, adverse impacts on ethnographic resources result both from the inadvertent interruption of traditional practices by visitors and continued visitor access to the gypsum sand dunes. In addition, ongoing American Indian consultations result in the beneficial sharing of knowledge of indigenous plants with park staff.

Outside the park, past, present, and reasonably foreseeable actions such as subdivision development, gas and oil exploration and development, and the construction of windmill farms and communication towers could intrude on places of cultural importance. Impacts on ethnographic resources could be adverse and long-term and could range in intensity from minor to moderate. Implementation of the no action alternative would contribute minor to moderate, adverse impacts and minor beneficial impacts to the adverse impacts of other past, present, and reasonably foreseeable actions. The beneficial impacts associated with the no action alternative would be a very small component of the cumulative impacts, which would be minor to moderate and adverse.

**Conclusion.** Continued park-related use of the sand dunes would result in moderate, adverse, long-term impacts. Visitors using

other areas of the park would have minor adverse effects on individuals observing sacred rituals or seeking solitude to practice traditional beliefs. The alternative would have negligible impacts on visitor patterns of viewing the Our Lady of Guadalupe image. Impacts from increased park staff knowledge about indigenous plants would be beneficial and long-term.

The cumulative impacts would be long-term, minor to moderate, and adverse. This alternative's contribution to these effects would be minor to moderate.

### **Museum Collections**

The park's museum collections would continue to be adequately inventoried, accessioned, and protected according to NPS standards. However, more space for curation, storage, and research will be needed in the future. During the life of the general management plan, a part of the park's museum collections could be moved to a facility outside the park, such as a university, college, or museum. There, the specimens would be housed under state-of-the-art museum standards for fire detection and suppression; security; temperature and humidity control; and curation, storage, and research space. Providing more space for curation, storage, and research would have a beneficial, long-term impact on the park's museum collections.

The utmost care would be exercised during the packing, moving, and unpacking of all collections. Therefore, potential impacts on the park's museum collections associated with the risk involved in moving artifacts, specimens, and archives would be negligible to minor, adverse, and short-term. Moving part of the park's museum collections to a facility outside of the park would be less convenient for park staff who need to use the collections for research or study, which would be a minor to moderate, adverse, long-term impact.

**Cumulative Impacts.** The park's museum collections have been and continue to be

adequately stored and protected according to NPS standards. In the future, part of the park's museum collections might have to be moved to quarters with more space, perhaps to a university, college, or museum in the region. Impacts on the park's museum collections when adequate space for curation, storage, and research was acquired would be beneficial and long-term.

At Carlsbad Caverns National Park the museum collections and archives were moved out of the visitor center to a self-contained Bally building. The security and safety of the collections has been improved, and more curatorial and storage space is provided. This resulted in a long-term, beneficial impact on regional museum collections.

Implementation of the no action alternative would potentially contribute beneficial impacts when associated with other past, present, and reasonably foreseeable actions. The cumulative impact on museum collections would be beneficial and long-term.

**Conclusion.** Insufficient space in the park would result in negligible to minor, adverse, short-term impacts on museum pieces during moving and a minor to moderate, adverse, long-term impact on the ability of park staff to use offsite collections for research or study.

The cumulative impacts on the museum collections would be long-term and beneficial. This alternative's contribution to these effects would be beneficial.

## **VISITOR EXPERIENCE AND UNDERSTANDING**

### **Access, Activities and Destinations, and Scenic Views**

**Access.** Most visitors arrive at Guadalupe Mountains National Park by car. Within the park, access to developed sites is mostly by driving, while the interior of the park is



accessed by hiking. Horseback riding is allowed on some trails.

Continuing four-wheel drive, high-clearance-vehicle access to Williams Ranch would continue to limit access for some visitors. The Salt Basin Dunes would continue to be accessible only on foot, which limits access for some visitors. This would result in a long-term, adverse impact for visitors who wanted to access these areas but could not. The intensity of the impact would depend on personal perceptions but typically would range from negligible to minor. Visitors who can access these areas and who desire solitude may benefit from the low frequency of encounters with others in these parts of the park.

**Activities and Destinations.** Visitors would continue to experience the park primarily as a natural scenic resource, with hiking being a popular activity. Developed areas such as Pine Springs, Frijole Ranch, McKittrick Canyon, and Dog Canyon would continue to receive the types and amount of uses that occur today. Use of the backcountry would continue, both for day hiking and backpacking. A small increase in use of the Salt Basin Dunes could occur as a result of publicity and word of mouth. Beneficial impacts would derive from the continued availability of enjoyable experiences.

The parking and picnic areas at Frijole Ranch would be relocated and improved, and the cultural landscape would be rehabilitated. These changes would have a beneficial impact on visitor experience at this location by allowing visitors to experience the ranch and its cultural landscape from the early 1900s era, and by expanding recreational opportunities.

Continuing use of the Ship-on-the-Desert structure as a quarters and meeting facility for researchers and volunteers would have a beneficial impact on its users.

**Scenic Views.** Guadalupe Mountains National Park visitors described viewing wilderness and scenery, day hiking, viewing

nature, and watching wildlife as the most important reasons for visiting the park (University of Texas at El Paso, 1997). Under alternative A, visitors would continue to benefit from the opportunity to view the scenery, including wildlife, geologic formations, and cultural features, from numerous locations within and outside the park.

**Cumulative Impacts.** Anticipated population growth in urban areas of west Texas and on the western side of the park could cause increased visitation from those areas. This could lead to adverse impacts relating to crowding at highway turnouts or reduced solitude at selected locations.

Development of food, lodging, or gasoline facilities near the park could have adverse impacts on scenic views while improving the availability of visitor services.

Cumulative adverse impacts on access, activities, and destinations would be minor. Implementation of alternative A would have a minor contribution to the cumulative impact. Future outside-the-park development could have a moderate to major adverse impact on scenic views. The beneficial contribution of alternative A to the continued protection of scenic views is substantial.

**Conclusion.** Alternative A would have negligible to minor, long-term, adverse impacts on visitor access and beneficial impacts for visitors desiring solitude. It would have beneficial impacts on activities and destinations and on scenic views.

Cumulatively, actions of others would have generally adverse impacts. Implementation of alternative A would continue to be important in protecting scenic views outside the park.

### **Interpretation, Education, and Orientation**

**Interpretation.** Only a small fraction of visitors to Guadalupe Mountains National Park attend interpretive programs. The

national average for the National Park Service in 2003 was about 5 percent of visitors attend formal interpretive programs. Park staff confirm that this value probably is reasonable for Guadalupe Mountains National Park. Participants' satisfaction with and the perceived importance of those programs is very high. Informal contacts with NPS staff and volunteers are more frequent, and also are highly rated.

Interpretive media, such as the park brochure and wayside exhibits, are encountered by a larger percentage of visitors than are personal programs. Visitor satisfaction with these elements is relatively high. Under alternative A, park visitors would continue to benefit from the availability of effective park and trail folders and outdoor wayside exhibits.

**Education.** Under alternative A, the impacts of educational programs on participants' attitudes, knowledge, and behavior would continue to be greater than for public interpretive programs. This would include beneficial impacts associated with the ability to contact groups with little previous access to or experience in national parks, and to contact people before they visit the park. The effectiveness of delivering offsite programs would continue to be limited by the absence of direct sensory experiences with park resources.

**Orientation.** Visitors would continue to receive information and orientation about the park from multiple sources. Contacts with park staff at visitor facilities, through roving contacts, and at programs would continue to be an important, personal source. Other common information sources would continue to be bulletin boards, park publications, area residents and service workers, travel and tour publications, the Internet, telephone and mail inquiries, and friends and neighbors who have visited the park.

Orientation exhibits in the Pine Springs visitor center and McKittrick Canyon contact station would continue to be

supplemented for many visitors by personal services. Information and media on the west side of the park would continue to be limited to a contact station in Dell City, which many visitors miss. This results in continuing minor, long-term, adverse impacts on visitors to the park's west side.

**Cumulative Impacts.** Internet use among the general population and continued development and improvement of the park Internet site would continue to have a long-term, beneficial impact on visitor information and orientation because of increased availability of information. Activities by partners, including schools, news outlets, community agencies, travel services, and local and state jurisdictions, would provide long-term, beneficial cumulative impacts. Collectively with alternative A, the long-term impact would be beneficial.

**Conclusion.** Alternative A would have beneficial impacts on interpretation, education, and orientation. Limited access to information at the Dell City contact station would have continuing minor, long-term, adverse impacts on visitors to the park's west side.

The cumulative impact with other information sources would be beneficial.

## THE SOCIOECONOMIC ENVIRONMENT

### Regional Economic and Demographic Conditions

Implementation of the no action alternative would continue to provide economic benefits to the counties but would contribute little to future growth. Current management practices and visitor services would continue. The park's ongoing efforts to enhance interpretation and the visitor experience would continue. Facility and other capital improvement projects would be undertaken as funding was available.

Little or no change in the park's staffing levels or budgets would occur under the no action alternative.

Visitation levels have fluctuated between about 180,000 and 230,000 visits annually since 1993. Visitation could trend slightly higher over time with an increase in the regional populations and improved visitor interpretation and services. Some of the increase would likely be a result of continuing economic and population growth of the neighboring El Paso and Odessa-Midland metropolitan areas, which are the points of origins for many repeat visitors to the park.

About 90 percent of the visits to the park are day-use, with overnight stays accounting for the remainder. Camping fees collected by the park might increase over time. The increased visitation could also generate additional retail spending at park facilities and the few nearby commercial businesses along the primary highway access corridors. The increased visitor spending could boost the park's regional economic stimulus above the current \$10.6 million in output and an estimated 177 jobs.

### **Housing and Community Infrastructure**

More than half of the park's staff members live in communities outside the park, primarily Carlsbad, New Mexico, and the entire staff and their dependent households travel to these communities for shopping, health care, banking, education, and other services, which results in a beneficial effect on the local economy. The park also maintains housing for staff in critical positions, operates water and wastewater systems, and has onsite fire and emergency medical equipment. Park personnel provide law enforcement, fire suppression, and emergency medical services within the park. The no action alternative would not alter any of these aspects of the park's operations.

Visitors to the park support the region's tourism industry, a beneficial socioeconomic effect. They also impose demands on local

services and infrastructure when traveling through these communities or spending one or more nights in local lodging accommodations. Minor adverse impacts of alternative A on the local and regional economy would relate to minimally increased demand for public services, such as police, fire, and road maintenance. These demands are likely to be offset by the fees, sales and property taxes, and other revenues that support state and local government operations and are generated by staff and visitors, for a net beneficial effect. Such revenues would increase over time as visitation increased, resulting in a long-term, beneficial impact to community infrastructure.

**Cumulative Effects.** Other projects affecting the socioeconomic environment near the park include the construction of telecommunications facilities (including cell phone towers), pipelines, and wind-turbine electric generating facilities along the U.S. Highway 62/180 corridor or in the Delaware Mountains. Potential impacts from such construction include increases in visitation at the park, and short-term demands on highway patrol and highway maintenance functions.

Increases in residential development on private lands adjacent to the park's southern and western sides could result in increased visitation levels at the park and require additional management efforts along those park boundaries. Under the no action alternative, this could require a reallocation of staff, decreasing their availability in other areas of the park.

Cumulative effects on regional socioeconomic conditions generally would be beneficial. The no action alternative's contribution to these effects would be very small.

**Conclusion.** Alternative A would have beneficial impacts on regional economic and demographic conditions, area housing, and community infrastructure.

Cumulative effects on regional socioeconomic conditions generally would be beneficial and this alternative's contribution to these effects would be very small.

## **PARK OPERATIONS, FACILITIES, AND EQUIPMENT**

### **Management and Administration**

The park staff would continue to use shared administrative functions of procurement, contracting, and human resources services at the "town office" in Carlsbad, New Mexico. This would continue to be a long-term benefit for park operations because it saves park budget and staffing requirements.

There originally were operational efficiencies from the combination of park administration and visitor functions at the centralized Pine Springs headquarters facility. However, because of the growth in office space needs, some of the benefits of co-location have been lost as other buildings have been used to accommodate headquarters overflow. This condition would increase under the no action alternative and would result in a long-term, moderate, adverse impact on operations.

Park management is striving to streamline its operations organization. To achieve resources management goals, the National Park Service would hire more seasonal and term position rather than using full-time staff for these activities. This will enable park management to be more efficient and flexible in budgeting, and would result in a long-term benefit to park operations.

### **Employee Housing**

Existing onsite park housing, including the Dog Canyon ranger station, would continue to have a long-term, beneficial impact because it would provide an onsite presence and would allow park staff to be available for situations requiring emergency services or timely infrastructure repairs. Although the park currently has adequate housing units

for these required residents, some units are being used to supplement the inadequate office space for park administration. Over the long term, alternate uses of park housing units could reduce the park's ability to have housing available to meet future critical staffing needs. This would adversely impact the park's ability to recruit seasonal employees or volunteers who would need park housing and would result in a long-term, moderate, adverse impact.

### **Maintenance**

The park would continue to maintain all park and visitor facilities and infrastructure through cyclic and repair/rehabilitation programs. However, with an aging infrastructure, the past addition of new lands on the park's west side, and the potential of increasing visitation, the park staff could be presented with increasing challenges in carrying out the park's maintenance requirements, and deferred maintenance would continue to accumulate. Based on these factors, this alternative would continue to present a long-term, minor, adverse impact on park operations, resulting from deferred maintenance.

Relocating the pack animal operations to the Pine Springs area would be a long-term benefit because it would consolidate park maintenance activities and increase efficiency.

**Cumulative Impacts.** Increased development that is occurring outside the park boundary would lead to new access roads, buildings, and informal trails. Additional maintenance activities such as fencing and landscape restoration would be necessary to mitigate the impacts on park lands. This alternative, in combination with the impacts above, would result in cumulative impacts on operations that would be minor, adverse, and long-term. However, this alternative's direct contribution to these effects would be slight.

**Conclusion.** Insufficient administrative space that resulted in a loss of efficiencies,

and the conversion of housing to office space that reduced the park's ability to meet housing needs for critical staff have resulted in long-term, moderate, adverse impacts on operations. Deferred maintenance would represent a long-term, minor, adverse impact on park operations. A long-term benefits result from use of consolidated administrative functions in a "town office" in Carlsbad and relocation of the pack animal operations to the Pine Springs area.

The cumulative impacts would be minor, adverse, and long-term, and this alternative's contribution would be slight.

#### **THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The intent of this determination is to identify whether the alternative to continue current management would result in trading the immediate use of the land for any long-term management possibilities or the productivity of park resources that would affect future generations. It is intended to determine whether alternative A would be a sustainable action that could continue over the long-term without environmental problems.

Alternative A would be a sustainable action that would not change the use of Guadalupe Mountains National Park or affect the long-term productivity of lands affected by its operation for future generations.

#### **IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD BE INVOLVED SHOULD THE ALTERNATIVE BE IMPLEMENTED**

The intent of this evaluation is to identify whether this alternative would result in

effects on resources that could not be changed over the long term or would be permanent. An effect on a resource would be irreversible if the resource could not be reclaimed, restored, or otherwise returned to its condition before the disturbance. Irretrievable commitments of resources are those that are lost for a period of time.

There would be an irreversible loss of wildlife in the park resulting from collisions with vehicles. There would be an irreversible loss of paleontological resources because of damage or loss resulting from trail development and use. Under this alternative there would be no irretrievable loss of resources.

#### **ADVERSE IMPACTS THAT CANNOT BE AVOIDED SHOULD THE ACTION BE IMPLEMENTED**

The intent of this determination is to identify whether this alternative would result in impacts that could not be fully mitigated or avoided. The focus of this assessment is on environmental impact topics that would involve greater than minor adverse impacts.

Under alternative A, the continued irrigation of the shade trees and lawns at Frijole Ranch would have a minor to moderate, long-term, adverse impact on vegetation because it could encourage growth of non-native species. Continued park-related use of the sand dunes would result in moderate, adverse, long-term impacts on ethnographic resources. There would be a minor to moderate, adverse, long-term impact on the ability of park staff to use offsite collections for research or study. The park's continued inability to meet housing needs for critical staff would have a long-term, adverse impact on park operations.



Aerial View of Pine Springs and El Capitan

## PREFERRED ALTERNATIVE

### NATURAL RESOURCES

#### Soils

Many of the impacts of the preferred alternative on soils would be the same as for the no action alternative. Specifically, soil disturbance from ongoing use and maintenance of park facilities would have minor, adverse, long-term impacts. Pedestrian traffic and its related soil erosion would result in minor, long-term, adverse impacts. Impacts of past development, such as the creation of impervious surfaces, the diversion of precipitation from natural drainages, and the compaction of soils, would continue to be long-term, adverse, and minor.

Actions of the preferred alternative would disturb about 100 acres of soil throughout the park. Many of these areas have been previously disturbed. All sites with soil disturbance would undergo accelerated wind and water erosion, at least temporarily, until drainage structures were fully operational and vegetation had recovered in cleared areas that were not converted to impervious surfaces.

During construction, the National Park Service would require the use of best management practices to prevent soil loss. For example, this would include installing silt fences, conserving available organic matter by retaining and replacing topsoil, and requiring prompt revegetation. However, the soils of the area have low resilience to disturbance, and the aridness of the area would increase the time required for vegetation to become established (if it did become established). During construction, the short-term impacts on soils would be adverse and minor. The long-term, adverse impacts associated with new development would be negligible to minor.

Trail rehabilitation and realignment in the preferred alternative would reduce soil erosion and trail maintenance in problem areas. During implementation, the short-term impacts on soils would be adverse and minor. Long-term impacts in these areas would be beneficial.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact soil resources would be the same as those described for alternative A. These developments have resulted and would continue to result in long-term, moderate to major, adverse impacts on soil resources. The actions associated with the preferred alternative would have a negligible long-term contribution to these cumulative impacts on soil resources.

**Conclusion.** Most impacts of the preferred alternative on soils would be the same as for the no action alternative. Construction activities on approximately 100 acres would result in short-term, adverse, minor impacts on soils. The long-term impacts from development of new facilities would be adverse and negligible to minor in intensity. The long-term impacts of trail rehabilitation and realignment would be beneficial.

Regionally, cumulative impacts on soils would be moderate to major, long-term, and adverse. This alternative would contribute a very small increment to these cumulative impacts.

#### Plant Communities and Vegetation

Many of the impacts of the preferred alternative on plant communities and vegetation would be the same as those described for the no action alternative. Specifically, maintenance and ongoing visitor use would have negligible to minor, long-term, adverse effects on vegetation. Continued irrigation of the shade trees and lawns at Frijole Ranch would maintain the

growth of unnaturally lush vegetation and allow exotic species to flourish, a minor to moderate, long-term, adverse impact. The proposed boundary change would have negligible impacts on vegetation, and beneficial impacts could result from arrangements that protected vegetation and plant communities outside the park.

Actions of the preferred alternative would permanently remove about 100 acres of vegetation throughout the park. Because of the relatively small area involved (about 0.2 percent of the park), the intensity of the long-term, adverse impact on native vegetation would be minor.

During and after construction, the National Park Service would require the use of best management practices to minimize impacts on vegetation and plant communities. This would include actions such as marking and strictly enforcing construction area boundaries, conserving available organic matter by retaining and replacing topsoil, and requiring prompt revegetation. To provide more rapid recovery of native vegetation and minimize the encroachment of invading species, seeds of native species gathered in the park would be sown on disturbed areas or would be propagated elsewhere, with the seedlings transplanted to disturbed sites. During a recovery period of several years, the seeded or replanted native vegetation would not be identical in composition to vegetation before construction, but a diverse community similar to the natural condition eventually would develop. As a result, while the short-term impacts of construction would be minor to moderate and adverse, the long-term impact on restored areas would be negligible.

The preferred alternative's approach of eradicating target invasive species of exotic plants throughout the park and implementing more strict prevention measures would result in long-term beneficial impacts on native vegetation and plant communities.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact vegetation and plant communities would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on native vegetation and plant communities. The actions associated with the preferred alternative would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of the preferred alternative on vegetation and plant communities would be the same as for the no action alternative. In addition, there would be minor to moderate, adverse, short-term impacts related to construction, long-term, minor, adverse impacts from the permanent removal of about 100 acres of native vegetation from sites that would be occupied by new development, and long-term beneficial impacts from more aggressive control of invasive, exotic plants.

Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on vegetation. This alternative would contribute a very small increment to these cumulative impacts.

## Wildlife

Many of the impacts of the preferred alternative on wildlife would be the same as those described for the no action alternative. Specifically, past development that resulted in wildlife habitat loss and fragmentation, and ongoing wildlife disturbances by human activities would continue to have negligible to minor, adverse, long-term impacts on wildlife. Collisions of vehicles with wildlife would continue to have in a minor, long-term, adverse impact. The proposed boundary change would have negligible impacts on wildlife, and beneficial impacts could result from arrangements that protected wildlife resources outside the park.



Actions of the preferred alternative would permanently remove about 100 acres of wildlife habitat throughout the park. Because of the relatively small area involved (about 0.2 percent of the park), the intensity of the long-term, adverse impact on wildlife would be minor.

During construction, some smaller animals might be killed or forced to relocate to areas outside the construction zones. Larger animals would probably avoid construction sites and would not be at direct risk for increased mortality. Overall, populations of affected species would decrease slightly during construction, a short-term, minor, adverse effect. Once construction was completed and construction sites were restored as described under “Plant Communities and Vegetation,” the long-term impacts on wildlife in these areas would be negligible.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact wildlife would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on wildlife. The actions associated with the preferred alternative would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of the preferred alternative on wildlife would be the same as for the no action alternative. In addition, there would be minor, adverse, short-term impacts related to construction and long-term, minor, adverse impacts from the permanent removal of about 100 acres of wildlife and habitats from sites that would be occupied by new development.

Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on wildlife. This alternative would contribute a very small increment to these cumulative impacts.

## **Geologic Resources**

Many of the impacts of the preferred alternative on geologic resources would be the same as those described for the no action alternative. Specifically, this alternative would have negligible impacts on such geologic processes as rock weathering, mass wasting, dune formation, and the development of sinkholes. Long-term, adverse impacts of negligible to minor intensity would result from continued park use and operation, including trail use and maintenance, use of caves, and the use by researchers and others of the geologic formation reference stratotypes. The proposed boundary change would have negligible impacts on geology, and beneficial impacts could result from arrangements that protected geological resources outside the park.

Development activities on about 100 acres could indirectly impact geologic processes by modifying surface drainage patterns that could impact groundwater and its discharge to ephemeral streams. Careful siting to, for example, route existing drainages around new development, control runoff from newly impervious surfaces, and minimize erosion, would reduce the impacts of development activities. As a result, the intensity of the adverse, long-term impacts would be minor.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact geologic resources would be the same as those described for alternative A. Long-term, adverse impacts on the near-surface geology from these developments are localized and range in intensity up to moderate. Cumulative impacts from these developments on geologic formations that are more than 50 feet from the surface have been negligible. The preferred alternative would contribute only very slightly to near-surface cumulative impacts on geologic resources and would have negligible effects on deeper formations.

**Conclusion.** Many of the impacts of the preferred alternative on geologic resources would be the same as for the no action alternative. In addition, there would be indirect, long-term, minor, adverse impacts on geology from changes in drainage patterns on and around the approximately 100 acres that would be occupied by new development.

The cumulative impacts on near-surface geologic resources would be long-term and adverse, and locally could be of moderate intensity. This alternative would contribute a very small increment to these cumulative impacts.

### **Paleontological Resources**

Many of the impacts of the preferred alternative on paleontological resources would be the same as those described for the no action alternative. Specifically, this alternative would have adverse, minor, long-term impacts because of hiking trail use, trail use by horses, use of caves, and access to type fossil localities. Indirect beneficial impacts would result from activities that exposed fossils in the park for research and visitor interpretation. The proposed boundary change would have negligible impacts on paleontological resources, and beneficial impacts could result from arrangements that protected paleontological resources outside the park.

The proposed low-country camping area below the eastern escarpment is in an area with a high potential for paleontological resources. It might be possible to site the new camping facility in an area of low paleontological sensitivity and to avoid paleontological resources. If paleontological resources could not be avoided, the impacts could be mitigated, such as by collecting or stabilizing *in situ* fossils that might otherwise be destroyed or damaged. As a result, the hike-in camping area would have a minor, adverse, long-term impact on paleontological resources.

Improvement of the McKittrick Nature Trail would cause minor, adverse, long-term impacts on paleontological resources. While salvage mitigation efforts could reduce these impacts, the intensity would remain minor.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact paleontological resources would be the same as those described for alternative A. Long-term, adverse impacts on paleontological resources in the near-surface and in caves from these developments have been localized and range in intensity up to moderate. Cumulative impacts from these developments on paleontological resources that are more than 50 feet from the surface (other than in caves) have been negligible. The preferred alternative would contribute only very slightly to cumulative impacts on paleontological resources in the near-surface and in caves and would have negligible effects on deeper resources.

**Conclusion.** Many of the impacts of the preferred alternative on paleontological resources would be the same as for the no action alternative. In addition, there would be long-term, minor, adverse impacts on paleontological resources from establishing a low-country camping area below the eastern escarpment and from improving the McKittrick Nature Trail.

The cumulative impacts on paleontological resources in the near-surface and in caves would be long-term and adverse, and locally could be of moderate intensity. This alternative would contribute a very small increment to these cumulative impacts.

## **CULTURAL RESOURCES**

### **Archeological Resources**

Many of the impacts of the preferred alternative on archeological resources would be the same as those described for the no action alternative. Specifically, few if any adverse effects would be anticipated from

existing trails; picnic, camping, and parking areas; and use of caves. Surveys and avoidance would ensure that most trail maintenance would have no adverse effects on archeological resources. If significant archeological resources could not be avoided, the effects would be adverse and a memorandum of agreement would be negotiated with the Texas state historic preservation officer regarding how the adverse effects would be mitigated.

The preferred alternative would result in new facilities on about 100 acres within the park, plus construction disturbances on additional lands surrounding the new facilities. Other park areas that still have evidence of past disturbance would be restored. Archeological surveys would precede any ground disturbance associated with any of these activities. Because national register-listed or -eligible archeological resources would be avoided to the greatest extent possible, no adverse effects on archeological resources would be anticipated. If, however, significant archeological resources could not be avoided, the effects on such resources would be adverse, and an appropriate mitigation strategy would be developed in consultation with the Texas state historic preservation officer and, if necessary, associated American Indians.

Before removal of any remnants of historic ranching activities in backcountry and designated wilderness areas, a survey for archeological resources in the general vicinity of the affected structure would be designed and conducted in consultation with the Texas State Historic Preservation Officer. The excavation, recordation, and mapping of any significant cultural remains would be completed before demolition to ensure that important archeological data that otherwise would be lost was recovered and documented. Impacts on archeological resources associated with such structures would be adverse.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact archeological resources would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on archeological resources. The actions associated with the preferred alternative would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of the preferred alternative on archeological resources would be the same as for the no action alternative. There could be additional adverse effects from the construction of new facilities on about 100 acres, from site restoration and from removal of remnants of historic ranching activities.

Cumulatively, there would continue to be adverse effects on the region's archeological resources. This alternative would contribute a very small increment to these cumulative impacts.

### **Historic Structures**

Many of the impacts of the preferred alternative on historic structures would be the same as those described for the no action alternative. Specifically, stabilization or preservation efforts and visitor use of historic structures would result in few if any adverse effects.

In the preferred alternative, rehabilitation would be included in the activities (along with stabilization, preservation, and regular maintenance) that would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, and 1995b). As a result, there would be no adverse effects on the park's historic structures from any of this alternative's stabilization, preservation, or rehabilitation efforts.

Impacts on national register-listed or -eligible structures that either would be removed or allowed to deteriorate naturally

would be adverse effects. However, these actions would not occur without prior review by park and region cultural resource specialists, including approval by the regional director and consultation with the Texas state historic preservation officer. Before such a structure was either removed or allowed to deteriorate, appropriate documentation recording the structure would be prepared in accordance with Section 110 (b) of the National Historic Preservation Act and the documentation would be submitted to the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscape Survey (HABS/HAER/HALS) program.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact historic structures would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on historic structures. The actions associated with the preferred alternative would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of the preferred alternative on historic structures would be the same as for the no action alternative. Additionally, there could be adverse effects from allowing national register-listed or -eligible structures to deteriorate naturally.

Cumulatively, there would continue to be adverse effects on the region's historic structures. This alternative would contribute a very small increment to these cumulative impacts.

### Cultural Landscapes

Many of the impacts of the preferred alternative on cultural landscapes would be the same as those described for the no action alternative. Specifically, there would be no adverse effect associated with the current rehabilitation of the Frijole Ranch house's cultural landscape, ongoing use and

maintenance at the national register-listed Frijole Ranch cultural landscape.

Before rehabilitation was implemented for the cultural landscapes associated with Williams Ranch and Ship-on-the-Desert, cultural landscape reports would be prepared for each property. Conformance with these reports would ensure that rehabilitation of the landscapes would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, 1995b). As a result, there would be no adverse effects on either landscape.

The preferred alternative would not include rehabilitation or other actions for any of the other eight potential cultural landscapes in the park. Within these landscapes, the National Park Service would not perform any construction or removal of any structures or facilities that could potentially alter the character-defining features (topography, vegetation, circulation features, spatial organization, and land use patterns) of the landscapes. As a result, no adverse effects would be anticipated.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact cultural landscapes would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on cultural landscapes. The actions associated with the preferred alternative would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of the preferred alternative on cultural landscapes would be the same as for the no action alternative. Aspects of the preferred alternative would result in no adverse effects on the park's cultural landscapes.

Cumulatively, there would continue to be adverse effects on the region's cultural landscapes. This alternative would contribute a very small increment to these cumulative impacts.

## **Ethnographic Resources**

Many impacts of the preferred alternative on ethnographic resources would be the same as those described for the no action alternative. Specifically, visitors using many areas of the park would have minor adverse effects on American Indians observing sacred rituals or seeking solitude to practice traditional beliefs. The alternative would have negligible impacts on visitor patterns of viewing the Our Lady of Guadalupe image. Impacts from increased park staff knowledge about indigenous plants would be beneficial and long-term.

This alternative would increase use of the Salt Basin Dunes area by providing new facilities, including a new trailhead about a mile within the park with a parking lot, picnic tables, and restroom. Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact ethnographic resources would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, minor to moderate, adverse impacts on ethnographic resources. The actions associated with the preferred alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

**Conclusion.** Many impacts of the preferred alternative on ethnographic resources would be the same as those associated with alternative A. Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo.

Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a

minor to moderate, long-term, adverse contribution to the cumulative impacts.

## **Museum Collections**

As in the no action alternative, the park's museum collections would continue to be adequately inventoried, accessioned, and protected according to NPS standards. However, the preferred alternative would move the majority of the park's collections off-site. A representative sample of the collections would be stored in the park. This would make access to the collections convenient for park staff who need to use the collections for research, training, or interpretation and would result in a beneficial, long-term impact. Other effects would be the same as in the no action alternative.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact museum collections would be the same as those described for alternative A.

**Conclusion.** The preferred alternative would have a beneficial, long-term impact by improving park staff access to museum collections for research or study. Other effects, including cumulative impacts, would be the same as in the no action alternative.

## **VISITOR EXPERIENCE AND UNDERSTANDING**

### **Access, Activities and Destinations, and Scenic Views**

**Access.** Long-term beneficial impacts on automobile access would result from additional parking at several sites in the park and from upgrades of the road to the Salt Basin Dunes trailhead and improved drainage of the road to Williams Ranch. Elsewhere in the park, impacts on access by roads would be negligible.

Long-term, beneficial impacts on hiking access would result from new or improved trailheads; improved signage; the mapping of

two new, primitive trails that lead from PX Well to the park's interior; and the possible addition of other primitive trails to the park's inventory. Elsewhere in the park, impacts on access by trails would be negligible.

Potentially, the increase in visitor use that would result from access improvements would have minor, long-term, adverse impacts on those visitors who desire more solitude.

**Activities and Destinations.** The construction of a new campground near Pine Springs that was designed for recreational vehicles and groups would result in an improved camping experience for these visitors. The new, hike-in campground below the eastern escarpment would provide a backcountry experience to visitors who formerly were not able to participate in this activity because of the strenuous hike that is required to access other backcountry sites. Road upgrades, new or upgraded trailheads, and/or improved parking or vehicular circulation would make the Williams Ranch, and Salt Basin Dunes areas more attractive as destinations and would lead to increased activities at these sites.

Improved and expanded exhibits at Pine Springs, McKittrick Canyon, the Salt Basin Dunes, and wayside locations throughout the park would enhance interpretation as an activity and make these sites more attractive as destinations. The exhibits would also make visitors more aware of the destinations and activities that are available throughout the park.

The landscape in the Pine Springs area would have a more natural appearance because of the removal of recreational vehicles from the trailhead parking lot. This also would allow hikers and picnickers to use the trailhead parking lot for its intended purpose.

Rehabilitating the Ship-on-the-Desert structure and landscape and using them to

support research and educational and operational activities would improve the enjoyment of many of its users by providing better facilities.

These would result in long-term, beneficial impacts.

Potentially, the increase in visitor use that would result from these improvements would have minor, long-term, adverse impacts on those visitors who desire more solitude.

The preferred alternative would remove many vestiges of ranching, including stock tanks, fences, and structures, from within the park. This action is consistent with the Congressional definition of wilderness, and would be seen as beneficial impacts by visitors who prefer the natural environments without traces of human development. However, these ranching remnants are popular with some visitors, and these people may perceive their loss as an adverse impact.

**Scenic Views.** Moving the location for recreational vehicle camping to a location outside the Pine Springs viewshed would have a long-term, beneficial impact on scenic views in the area.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact access, activities and destinations, and scenic views would be the same as those described for alternative A. The preferred alternative would have a negligible effects on cumulative impacts compared to the no action alternative.

**Conclusion.** The preferred alternative would have beneficial, long-term effects on access, activities and destinations, and/or scenic views at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, Ship-on-the-Desert. There could be minor, long-term, adverse impacts on visitors who desire more solitude. Cumulative impacts would be the same as the no action alternative.

## **Interpretation, Education, and Orientation**

**Interpretation.** At the redesigned visitor center at Pine Springs, visitors would benefit from the consolidation of multiple interpretive displays. Because more visitors would see the cultural exhibits, they could learn about the entire park story at a single location, and would have the opportunity for personal contact with park staff.

Rehabilitation of the cultural landscape features including outbuildings, at Frijole Ranch, and rehabilitation of the Williams Ranch cultural landscape would allow for more complete understanding of these resources. The addition of site-related interpretive exhibits to the rehabilitated Frijole Ranch site would improve visitor understanding and appreciation of west Texas ranching history. These enhancements would have a long-term, beneficial impact on the interpretation and understanding of this aspect of history in the park.

Expanded and renovated interpretive media in the McKittrick Canyon contact station would provide long-term, beneficial impacts by increasing visitor understanding and opportunities for interpretation, education, and orientation.

Waysides and other exhibits that were installed at several locations would provide both orientation and interpretive information to visitors throughout the park. The long-term benefit would be greatest for visitors who do not go to the visitor center or who arrive outside of regular park hours.

**Education.** Use of Ship-on-the-Desert to support research, education, and operational activities would have long-term, beneficial impacts on the understanding and appreciation of those participating in residential programs or day-use activities. The resulting research would support understanding and appreciation, and would enhance the management of park resources.

Expanded outreach education programs would have long-term, beneficial impacts on program participants, which would include populations that have not traditionally used the park.

**Orientation.** Certain aspects of the preferred alternative would have beneficial impacts on visitor orientation. These would include enhancement of the contact station at McKittrick Canyon; improved remote visitor information at Salt Basin Dunes, and additional wayside exhibits distributed more widely throughout the park.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact interpretation, education, and orientation would be the same as those described for alternative A. The preferred alternative would have a negligible effects on cumulative impacts compared to the no action alternative.

**Conclusion.** All of the impacts of the preferred alternative on interpretation, education, and orientation would be beneficial. The cumulative impact with other information sources would be negligible.

## **THE SOCIOECONOMIC ENVIRONMENT**

### **Regional Economic and Demographic Conditions**

Under the preferred alternative, the park's role in the socioeconomic environment would increase compared to the no action alternative. However, the benefits would be spread over the region, which includes four counties in two states, so impacts would not be highly visible.

The planned improvements to visitor services and opportunities to access more areas of the park would be considered an asset and could make a small, indirect contribution to population growth. In addition, the improvements may increase visitation to the park, which would benefit

regional businesses, particularly restaurants, hotels, markets, and gas stations.

Staffing levels could fluctuate over the life of this general management plan, with minor changes from year to year in permanent, seasonal, and volunteer staff. However, the effect would not be detectable in the local or regional economy and would be negligible.

Construction job opportunities for regional contractors and construction material and equipment suppliers would be created when new capital projects were undertaken. The impact of these construction-related activities would be beneficial in the short term and negligible in the long term.

### **Housing and Community Infrastructure**

Small fluctuations in staffing levels from year to year would result in small changes for housing demand. However, these changes would not be detectable in the local economy and the impacts would be negligible.

Visitation at the park would be expected to increase compared to the no action alternative. This would result in small increases in demand for public services, such as police, fire, and road maintenance, a long-term, minor, adverse impact. These demands would likely be offset by increases in the fees, sales and property taxes, and other revenues that would be generated by staff and visitors, a long-term, beneficial impact to community infrastructure.

**Cumulative Effects.** Cumulative impacts would be the same as described in the no action alternative. The contribution to socioeconomic cumulative effects from the preferred alternative generally would be beneficial but very small.

**Conclusion.** Increased visitation that would result from park improvements would have beneficial impacts on regional economics. Long-term, beneficial impacts to community infrastructure would result. Cumulative effects on regional socioeconomic conditions generally would be beneficial but very small.

## **PARK OPERATIONS, FACILITIES, AND EQUIPMENT**

### **Management and Administration.**

Continued use of shared administrative functions at the “town office” in Carlsbad would have a negligible impact compared to alternative A. Continued implementation of operational efficiencies would have a long-term benefit.

A new, consolidated headquarters complex at the Pine Springs site would result in a long-term, beneficial impact. This facility would increase the efficiency and effectiveness of park operations and make more space available to support visitor services.

Enlarging the water storage system at Dog Canyon would enhance the NPS’ ability to protect resources in the northern part of the park, a long-term, beneficial impact.

**Employee Housing.** The new, consolidated headquarters complex would enable the park to apply the two housing units that currently are used for office space to their original purpose. This would improve the ability of the park to recruit seasonal employees and attract volunteers, a long-term, beneficial impact.

**Maintenance.** All of the maintenance requirements that would occur under the no action alternative would occur in the preferred alternative. Additional maintenance demands would result from this alternative’s increased park road use, upgraded infrastructure, and construction of new facilities, including new campgrounds, trailheads, parking, waysides and other exhibits, and the administrative facility. Compared to the no action alternative, the impacts of increased maintenance would have a long-term, moderate, adverse impact on park operations. Reduced maintenance would result from the rehabilitation or realignment of problem trail segments, a long-term, beneficial impact.

**Cumulative Impacts.** The potential cumulative impacts for the preferred



alternative would be the same as described in the no action alternative and would be minor, adverse, and long-term. This alternative's contribution to these effects would be slight.

**Conclusion.** Long-term, beneficial impacts would result from the new, consolidated headquarters complex near Pine Springs, the ability to reclaim two Pine Springs housing units for their original purpose, improved water system at Dog Canyon, and reduced maintenance of rehabilitated or realigned trail segments. Increased maintenance associated with new or upgraded facilities in the park would have a long-term, moderate, adverse impact on park operations. Negligible impacts would result from the continued use of shared administrative functions in Carlsbad. Continued implementation of operational efficiencies would have a long-term benefit. Cumulative impacts would be the same as in alternative A, the no action alternative, and this alternative's contribution would be slight.

#### **RELATIONSHIP OF LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The intent of this determination is to identify whether the preferred alternative would result in trading the immediate use of the land for any long-term management possibilities or the productivity of park resources that would affect future generations. It is intended to determine whether the preferred alternative would be a sustainable action that could continue over the long-term without environmental problems.

The preferred alternative would be a sustainable action that would not change the use of Guadalupe Mountains National Park or affect the long-term productivity of lands affected by its operation for future generations.

It is the understanding of the National Park Service that the Tigua Indians of Ysleta del Sur Pueblo would prefer no visitor access to the sand dunes. This alternative calls for improving access and developing new visitor facilities in the vicinity of the sand dunes. Impacts on Tigua sensitivities from an expected increase in visitors to the sand dunes area would be moderate, adverse, and long-term.

#### **IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

The intent of this evaluation is to identify whether this alternative would result in effects on resources that could not be changed over the long term or would be permanent. An effect on a resource would be irreversible if the resource could not be reclaimed, restored, or otherwise returned to its condition before the disturbance. Irretrievable commitments of resources are those that are lost for a period of time.

Impacts on soils associated with some facility construction, such as the consolidated headquarters building, would be an irreversible commitment of resources because the soil profile would be permanently altered at the building site. There would be an irreversible loss of wildlife in the park resulting from collisions with vehicles. There would be an irreversible loss of paleontological resources because of damage or loss resulting from trail development and use. Removal of resources such as remnants of historic ranching in the park would be an irreversible loss of these resources.

There would be irretrievable impacts to vegetation and native plant communities and to wildlife and their habitats associated with site clearing for some of the new development in the park.

### **UNAVOIDABLE ADVERSE IMPACTS**

The intent of this determination is to identify whether this alternative would result in impacts that could not be fully mitigated or avoided. The focus of this assessment is on impact topics that would involve greater than minor impacts.

Under the preferred alternative, the continued irrigation of the shade trees and lawns at Frijole Ranch would have a minor

to moderate, long-term, adverse impact on vegetation because it could encourage growth of non-native species. An increase in the continued park-related use of the sand dunes would result in moderate, adverse, long-term impacts on ethnographic resources. Increased maintenance associated with new or upgraded facilities would have a long-term, moderate, adverse impact on park operations.

## ALTERNATIVE B

### NATURAL RESOURCES

#### Soils

Many of the impacts of alternative B on soils would be the same as for the no action alternative. Specifically, soil disturbance from ongoing use and maintenance of park facilities would have minor, adverse, long-term impacts. Pedestrian traffic and its related soil erosion would result in minor, long-term, adverse impacts. Impacts of past development, such as the creation of impervious surfaces, the diversion of precipitation from natural drainages, and the compaction of soils, would continue to be long-term, adverse, and minor.

Alternative B would include removing of the following facilities and restoring their sites to a natural condition.

- Tent campground at Pine Springs
- NPS pack animal operations at Pine Springs and Dog Canyon
- Public corrals near Frijole Ranch and Dog Canyon
- Recreational vehicle camping area at Dog Canyon

This action would involve restoring natural contours, routing runoff to natural drainages, and revegetating soils with native vegetation. The area to be restored would total about 100 acres, or about 0.2 percent of the park. This action would result in long-term, beneficial impacts on park soils.

This alternative would include a new trailhead with a parking lot just inside the park boundary west of the Salt Basin Dunes, and the construction of a turnaround at Williams Ranch. Their size collectively would be less than an acre, and the surfaces would be compacted soil, perhaps with some gravel. The impact on soils from these two small facilities would be negligible.

Trail rehabilitation and realignment in alternative B would reduce soil erosion in problem areas. During implementation, the short-term impacts on soils would be adverse and minor. Long-term impacts in these areas would be beneficial.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact soil resources would be the same as those described for alternative A. These developments have resulted and would continue to result in long-term, moderate to major, adverse impacts on soil resources. The actions associated with alternative B would have a negligible long-term contribution to these cumulative impacts on soil resources.

**Conclusion.** Most impacts of alternative B on soils would be the same as for the no action alternative. Long-term, beneficial impacts would result from restoring sites from which facilities had been removed and from trail rehabilitation and realignment.

Regionally, cumulative impacts on soils would be moderate to major, long-term, and adverse. This alternative would contribute a very small increment to these cumulative impacts.

#### Plant Communities and Vegetation

Many of the impacts of alternative B on plant communities and vegetation would be the same as those described for the no action alternative. Specifically, maintenance and ongoing visitor use would have negligible to minor, long-term, adverse effects on vegetation. Continued irrigation of the shade trees and lawns at Frijole Ranch would maintain the growth of unnaturally lush vegetation and allow exotic species to flourish, a minor to moderate, long-term, adverse impact. The proposed boundary change would have negligible impacts on vegetation, and beneficial impacts could result from arrangements that protected

vegetation and plant communities outside the park.

As described above for soils, native vegetation would be restored on about 100 acres of the park from which facilities had been removed. This would result in long-term, beneficial impacts to the park's plant communities and vegetation.

This alternative would include a new trailhead with a parking lot just inside the park boundary west of the Salt Basin Dunes, and the construction of a vehicle turnaround at Williams Ranch. Their size collectively would be less than an acre, and their impact on vegetation would be negligible.

This alternative would eliminate horse use throughout the park. Removal of horses would eliminate grazing by these animals near backcountry and designated wilderness trails during, for example, their riders' lunch breaks. Non-native vegetation, including invasive exotics, would no longer be introduced into these management zones as seeds that were deposited, undigested, in horse manure or from mud on horses' hooves. Impacts would be long-term and beneficial.

Alternative B would eradicate all species of exotic plants throughout the park and implement more strict prevention measures. To provide more rapid recovery of native vegetation and prevent invading species, locally collected seed would be used in an active planting program. Seeds of native species gathered in the park would be sown on disturbed areas or would be propagated elsewhere, with the seedlings transplanted to disturbed sites. During a recovery period of several years, the seeded or replanted vegetation would not be identical in composition to undisturbed areas, but a diverse community similar to the natural condition eventually would develop. This would result in long-term, beneficial impacts.

**Cumulative Effects.** Past, current, and foreseeably future actions within and

outside the park that impact vegetation and plant communities would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on native vegetation and plant communities. The actions associated with alternative B would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on vegetation and plant communities would be the same as for the no action alternative. In addition, long-term beneficial impacts would result from restoring native vegetation on about 100 acres from which park facilities had been removed, eliminating grazing and the spread of non-native seed by horses, and aggressively controlling exotic plants.

Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on vegetation. This alternative would contribute a very small increment to these cumulative impacts.

## Wildlife

Many of the impacts of alternative B on wildlife would be the same as those described for the no action alternative. Specifically, past development that resulted in wildlife habitat loss and fragmentation, and ongoing wildlife disturbances by human activities would continue to have negligible to minor, adverse, long-term impacts on wildlife. Collisions of vehicles with wildlife would continue to have in a minor, long-term, adverse impact. The proposed boundary change would have negligible impacts on wildlife, and beneficial impacts could result from arrangements that protected wildlife resources outside the park.

As described above, native vegetation (wildlife habitat) would be restored on about 100 acres of the park from which facilities had been removed. The location of all of the restored areas adjacent to developed, intensely used areas would lessen their

desirability and they would be of low value for species other than those that habituate to human use. Moreover, the 100 acres would not be contiguous, but would provide fragmented habitat in multiple locations. Therefore, the resulting long-term, beneficial impacts on wildlife primarily would be for smaller species and adaptable larger animals such as deer and coyotes.

This alternative would include a new trailhead with a parking lot just inside the park boundary west of the Salt Basin Dunes and the construction of a turnaround at Williams Ranch. The size would be less than an acre, and their impact on wildlife would be negligible.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact wildlife would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on wildlife. The actions associated with alternative B would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on wildlife would be the same as for the no action alternative. Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on wildlife. This alternative would contribute a very small increment to these cumulative impacts.

### Geologic Resources

Most impacts of alternative B on geologic resources would be the same as those described for the no action alternative. Specifically, this alternative would have negligible impacts on such geologic processes as rock weathering, mass wasting, dune formation, and the development of sinkholes. Long-term, adverse impacts of negligible to minor intensity would result from continued park use and operation, including trail use and maintenance and use of caves. The proposed boundary change

would have negligible impacts on geology, and beneficial impacts could result from arrangements that protected geological resources outside the park.

Alternative B would implement a permit system to provide access to the geologic formation reference stratotypes and fossil locations by researchers. This system would increase accountability and reduce the potential to damage to the reference stratotypes, but would not change the negligible to minor intensity of the long-term, adverse impacts that would occur in the no action alternative.

The removal of park facilities and restoration of natural conditions would have a negligible impact on geologic resources. The corrals and campgrounds that would be involved have few impervious surfaces and their removal would have little effect on groundwater and its discharges to ephemeral streams.

This alternative would include a new trailhead with a parking lot just inside the park boundary west of the Salt Basin Dunes and the construction of a turnaround at Williams Ranch. The size would be less than an acre, and their surfaces would be soil, perhaps with gravel. The parking area and turnaround would not change the infiltration of precipitation and their impact on geological resources would be negligible.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact geologic resources would be the same as those described for alternative A. Long-term, adverse impacts on the near-surface geology from these developments are localized and range in intensity up to moderate. Cumulative impacts from these developments on geologic formations that are more than 50 feet from the surface have been negligible. Alternative B would contribute only very slightly to near-surface cumulative impacts on geologic resources and would have negligible effects on deeper formations.

**Conclusion.** Impacts of alternative B on geologic resources would be the same as those that would occur from the no action alternative.

### **Paleontological Resources**

Many of the impacts of alternative B on paleontological resources would be the same as those described for the no action alternative. Specifically, this alternative would have adverse, minor, long-term impacts because of hiking trail use and use of caves. Indirect beneficial impacts would result from activities that exposed fossils in the park for research and visitor interpretation. The proposed boundary change would have negligible impacts on paleontological resources, and beneficial impacts could result from arrangements that protected paleontological resources outside the park.

Alternative B would implement a permit system to provide access to the geologic formation reference stratotypes and fossil locations by researchers. This system would increase accountability and reduce the potential to damage to the fossil locations, but would not change the negligible to minor intensity of the long-term, adverse impacts that would occur in the no action alternative.

This alternative's elimination of horse use in the park would eliminate the impacts on fossils along trails that currently result from the hammering action of horseshoes. This would result in a long-term, beneficial impact.

The parking lot west of the Salt Basin Dunes and the construction of a turnaround for vehicles at Williams Ranch would not be in areas that are known for paleontological resources. The impacts of these facilities would be negligible.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact paleontological resources would be the same as those described for alternative A. Long-term,

adverse impacts on paleontological resources in the near-surface and in caves from these developments have been localized and range in intensity up to moderate. Cumulative impacts from these developments on paleontological resources that are more than 50 feet from the surface (other than in caves) have been negligible. Alternative B would contribute only very slightly to cumulative impacts on paleontological resources in the near-surface and in caves and would have negligible effects on deeper resources.

**Conclusion.** The elimination of the hammering action of horseshoes on fossil deposits in trails would have a long-term, beneficial impact. All other impacts would be the same as those that would occur from the no action alternative.

The cumulative impacts on paleontological resources in the near-surface and in caves would be long-term and adverse, and locally could be of moderate intensity. This alternative would contribute a very small increment to these cumulative impacts.

## **CULTURAL RESOURCES**

### **Archeological Resources**

Many of the impacts of alternative B on archeological resources would be the same as those described for the no action alternative. Specifically, few if any adverse effects would be anticipated from existing trails; picnic and parking areas; and use of caves. Surveys and avoidance would ensure that most trail maintenance would have no adverse effects on archeological resources. If significant archeological resources could not be avoided, the effects would be adverse and a memorandum of agreement would be negotiated with the Texas state historic preservation officer regarding how the adverse effects would be mitigated.

Recontouring of the areas from which campgrounds and corrals had been removed would have the potential to affect

archeological resources. New or upgraded facilities that could affect archeological resources would include a new trailhead with a parking lot just inside the park boundary west of the Salt Basin Dunes, and the construction of a turnaround for vehicles at Williams Ranch Archeological surveys would precede any ground disturbance associated with any of these activities. Because national register-listed or -eligible archeological resources would be avoided to the greatest extent possible, no adverse effects on archeological resources would be anticipated. If, however, significant archeological resources could not be avoided, the effects on such resources would be adverse, and an appropriate mitigation strategy would be developed in consultation with the Texas state historic preservation officer and, if necessary, associated American Indians.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact archeological resources would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on archeological resources. The actions associated with alternative B would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on archeological resources would be the same as for the no action alternative. There could be additional adverse effects from site restoration, the construction or expansion of small parking facilities.

Cumulatively, there would continue to be adverse effects on the region's archeological resources. This alternative would contribute a very small increment to these cumulative impacts.

### Historic Structures

Many of the impacts of alternative B on historic structures would be the same as those described for the no action alternative.

Specifically, visitor use of historic structures would result in few if any adverse effects.

Alternative B would stress stabilization, preservation, and regular maintenance of historic structures. Because all of these actions would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, and 1995b), there would be no adverse effects on the park's historic structures.

Impacts on national register-listed or -eligible structures that either would be allowed to deteriorate naturally would be adverse effects. However, these actions would not occur without prior review by park and region cultural resource specialists, including approval by the regional director and consultation with the Texas state historic preservation officer. Before such a structure was either removed or allowed to deteriorate, appropriate documentation recording the structure would be prepared in accordance with Section 110 (b) of the National Historic Preservation Act and the documentation would be submitted to the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscape Survey (HABS/HAER/HALS) program.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact historic structures would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on historic structures. The actions associated with alternative B would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on historic structures would be the same as for the no action alternative. Additionally, there could be adverse effects from removing national register-listed or -eligible structures or allowing them to deteriorate naturally.

Cumulatively, there would continue to be adverse effects on the region's historic structures. This alternative would contribute a very small increment to these cumulative impacts.

### **Cultural Landscapes**

Many of the impacts of alternative B on cultural landscapes would be the same as those described for the no action alternative. Specifically, there would be no adverse effect associated with the current rehabilitation of the Frijole Ranch house's cultural landscape, ongoing use and maintenance at the national register-listed Frijole Ranch cultural landscape.

Alternative B would remove the tent campground from the Pine Spring area and restore the area to natural conditions. Because the campground is not identified as a character-defining feature in the cultural landscape inventory for the property (NPS 1999), the removal of its facilities would have no adverse effect on the national register-listed cultural landscape of the Pinery.

Alternative B would include stabilizing the cultural landscape at Williams Ranch and preserving the Ship-on-the-Desert cultural landscape. Because these actions would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, and 1995b), there would be no adverse effects on cultural landscapes.

Alternative B would not include rehabilitation or other actions for any of the other eight potential cultural landscapes in the park. Within these landscapes, the National Park Service would not perform any construction or removal of any structures or facilities that could potentially alter the character-defining features (topography, vegetation, circulation features, spatial organization, and land use patterns) of the landscapes. As a result, no adverse effects would be anticipated.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact cultural landscapes would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on cultural landscapes. The actions associated with alternative B would contribute a negligible increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on cultural landscapes would be the same as for the no action alternative. The elements of this alternative would result in no adverse effects on the park's cultural landscapes. Cumulatively, there would continue to be adverse effects on the region's cultural landscapes. This alternative would contribute a negligible increment to these cumulative impacts.

### **Ethnographic Resources**

Most impacts of alternative B on ethnographic resources would be the same as those described for the no action alternative. Specifically, continued park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo. Visitors using other areas of the park would have minor adverse effects on American Indians observing sacred rituals or seeking solitude to practice traditional beliefs. The alternative would have negligible impacts on visitor patterns of viewing the Our Lady of Guadalupe image. Impacts from increased park staff knowledge about indigenous plants would be beneficial and long-term.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact ethnographic resources would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, minor to moderate, adverse impacts on ethnographic resources. The actions associated with alternative B would



result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative B on ethnographic resources would be the same as for the no action alternative. Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

### **Museum Collections**

As in the no action alternative, the park's museum collections would continue to be adequately inventoried, accessioned, and protected according to NPS standards. However, alternative B would move the majority of the park's collections off-site. A representative sample of the collections would be stored in the park. This would make access to the collections convenient for park staff who need to use the collections for research, training, or interpretation and would result in a beneficial, long-term impact. Other effects would be the same as in the no action alternative.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact museum collections would be the same as those described for alternative A.

**Conclusion.** Alternative B would have a beneficial, long-term impact by improving park staff to museum collections for research or study. Other effects, including cumulative impacts, would be the same as in the no action alternative.

## **VISITOR EXPERIENCE AND UNDERSTANDING**

### **Access, Activities and Destinations, and Scenic Views**

**Access.** A long-term, adverse impact on access would result from closing the existing

road from the park's west boundary to the Salt Basin Dunes parking area. The intensity would be minor because, although the walk to the dunes would double, to about 2 miles, visitors could still get to the area on foot.

A minor, long-term, indirect, adverse impact on access would result from removing all camping from the park, other than in the backcountry. About 10 percent of all visitors currently camp overnight. These people would have to find overnight lodging outside the park and, in the morning, drive a substantial distance before they arrived at the park and engaged in recreational activities.

A moderate, long-term, adverse impact on access would result from the elimination of horse use. Some visitors who ride their own horses into the park's higher elevations may not be able to make the demanding climbs on foot and would no longer be able to access much of the park in the backcountry and designated wilderness zones.

Long-term beneficial impacts on automobile access would result from additional parking at the new Salt Basin Dunes trailhead. Beneficial impacts on access also would result from the possible addition of primitive trails, such as former ranch road traces and trails, to the park's inventory.

**Activities and Destinations.** The removal of all camping from the park except for the 10 backcountry sites would result in a major, long-term, adverse impact on activities and destinations. Although only about 10 percent of park visitors camp overnight in the park, many of these people perceive the campground as their primary destination. They associate a range of activities that they engage in at the campground, such as cooking and sleeping out, spending time with family and friends, having a campfire, or simply lounging in a chair and enjoying the scenery, as important components of their desired experience. Many of these visitors choose Guadalupe Mountains National Park as their destination because

camping and all of the activities associated with it are available.

The impacts of eliminating the use of horses by park visitors would depend largely on whether the visitors have access to horses and ride them in the park.

- Many riders would perceive the loss of horse use as a major, long-term, adverse impact. There are relatively few places to ride on public land in west Texas and southern New Mexico, and none provide the scenery and wilderness amenities of the park. Many riders select Guadalupe Mountains National Park as their destination because riding is allowed.
- Many non-riders would view the loss of horse use as a negligible or even beneficial, long-term impact. Many hikers dislike the horse manure and urine on park trails and may be more likely to choose Guadalupe Mountains National Park as a destination and to engage in hiking if the source of these products was removed. Visitors who enjoy watching horses would perceive a minor, long-term, adverse impact.

Potentially, the decreases in visitor use that would result from eliminating camping and horse use would have long-term, beneficial impacts on those visitors who desire more solitude.

Improved and expanded exhibits at Pine Springs, and McKittrick Canyon contact station would have a long-term, beneficial impact. The exhibits would enhance interpretation as an activity and make these sites more attractive as destinations. The exhibits would also make visitors more aware of the destinations and activities that are available throughout the park.

The attractiveness of the Williams Ranch area as a destination would be enhanced by stabilizing the cultural landscape, and providing a turnaround. This would be a minor, long-term, beneficial impact,

**Scenic Views.** Removing camping from the Pine Springs viewshed would have a long-term, beneficial impact on scenic views in the area.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact access, activities and destinations, and scenic views would be the same as those described for alternative A. Alternative B would have a negligible effect on cumulative impacts compared to the no action alternative.

**Conclusions.** Minor or moderate, long-term, adverse impacts on access would result from closing the road to the Salt Basin Dunes parking area, eliminating camping except in the backcountry, and eliminating horse use. Beneficial, long-term impacts on access would be associated with providing the turnaround at Williams Ranch and parking at the Salt Basin Dunes trailhead and from the possible addition of primitive trails to the park's inventory.

With regard to activities and destinations, a major, long-term, adverse impact would result from eliminating camping except in the backcountry. Eliminating horse use usually would be perceived as a major, long-term, adverse impact by riders and a negligible or beneficial impact by hikers.

Beneficial impacts on scenic views would result from removing camping from the Pine Springs area. Cumulative impacts would be the same as the no action alternative.

### **Interpretation, Education, and Orientation**

As described for the preferred alternative, all of the interpretation, education, and orientation impacts of alternative B would be long-term and beneficial. However, because interpretation, education, and orientation improvements would be less extensive than in the preferred alternative, the intensity of the benefit would not be as great.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact interpretation, education, and orientation would be the same as those described for alternative A. Alternative B would have a negligible effects on cumulative impacts compared to the no action alternative.

**Conclusion.** Additional beneficial impacts on interpretation, education, and orientation would occur, but the benefit would be less than in the preferred alternative. The cumulative impact with other information sources would be negligible compared to the no action alternative.

## THE SOCIOECONOMIC ENVIRONMENT

The elimination of camping at all but backcountry sites in Guadalupe Mountains National Park would increase regional demand for commercial camping and other overnight lodging. This would have a long-term, beneficial impact on regional economics.

Other impacts of alternative B on regional economic and demographic conditions housing and community infrastructure would be negligible compared to the no action alternative. Improvements in interpretation and other services at the park could increase day-use visitation, while the elimination of developed camping and horseback riding would reduce the use of the park for these purposes. Other changes associated with alternative B, such as staffing, housing demand, and expenditures for maintenance, would be small and would not be detectable in any jurisdiction within the four-county area around the park.

**Cumulative Effects.** Cumulative impacts would be the same as described in the no action alternative. The contribution to socioeconomic cumulative effects from the alternative B generally would be beneficial but very small.

**Conclusion.** Alternative B would have beneficial impacts on the regional economy because it would cause increased demand for commercial camping and other overnight lodging. Cumulative effects on regional socioeconomic conditions generally would be beneficial but very small.

## PARK OPERATIONS, FACILITIES, AND EQUIPMENT

### Management and Administration

All of the management and administration issues that would occur under the no action alternative also would occur in alternative B. The National Park Service would attempt to meet administrative needs by adapting existing structures in the maintenance and housing complex south of U.S. Highway 62/180, but these facilities already are at or near capacity. The lack of administrative space may seriously impede the ability of the staff to operate the park, resulting in moderate to major, long-term, adverse impacts on management and administration. Negligible impacts would result from the continued use of shared administrative functions in Carlsbad. Continued implementation of efficiencies identified in recent operational analyses would result in a long-term benefit.

### Employee Housing

The National Park Service would not commit any additional park housing units to administrative purposes. As a result, the impact on employee housing compared to the no action alternative would be negligible.

### Maintenance

The elimination of camping except in backcountry sites would result in few if any reductions in maintenance, because those facilities would continue to be used by day-use visitors. The ability to perform maintenance would be challenged by the lack of space caused by the need to share facilities with administrative services. As a

result, alternative B would have a moderate, long-term, adverse impact on the maintenance aspect of operations.

**Cumulative Impacts.** The potential cumulative impacts for alternative B would be the same as described in the no action alternative and would be minor, adverse, and long-term. This alternative's contribution to these effects would be slight.

**Conclusions.** The lack of space in buildings that would result from alternative B would have a moderate to major, long-term, adverse impact on management and administration, and a moderate, long-term, adverse impact on the maintenance aspect of operations. Negligible impacts would result from the continued use of shared administrative functions in Carlsbad, continued implementation of identified operational efficiencies, and continued use of employee housing for office space. Cumulative impacts would be the same as in alternative A, and this alternative's contribution would be slight.

#### **RELATIONSHIP OF LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The intent of this determination is to identify whether alternative B would result in trading the immediate use of the land for any long-term management possibilities or the productivity of park resources that would affect future generations. It is intended to determine whether alternative B would be a sustainable action that could continue over the long-term without environmental problems.

Alternative B would be a sustainable action that would not change the use of Guadalupe Mountains National Park or affect the long-term productivity of lands affected by its operation for future generations.

It is the understanding of the National Park Service that the Tigua Indians of Ysleta del

Sur Pueblo would prefer no visitor access to the sand dunes. This alternative calls for developing new visitor facilities in the vicinity of the sand dunes, but because they would be more distant than the current facilities, it is unclear if visitor use of this area would increase. If increased visitation to the sand dunes area occurred, impacts on Tigua sensitivities would be moderate, adverse, and long-term.

#### **IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

The intent of this evaluation is to identify whether this alternative would result in effects on resources that could not be changed over the long term or would be permanent. An effect on a resource would be irreversible if the resource could not be reclaimed, restored, or otherwise returned to its condition before the disturbance. An irretrievable commitment of resources involves the effects on resources that, once gone, cannot be replaced or recovered.

There would be an irreversible loss of wildlife in the park resulting from collisions with vehicles. There would be an irreversible loss of paleontological resources because of damage or loss resulting from trail development and use. Potential removal of resources such as historic structures would be an irreversible loss of these resources.

#### **UNAVOIDABLE ADVERSE IMPACTS**

The intent of this determination is to identify whether this alternative would result in impacts that could not be fully mitigated or avoided. The focus of this assessment is on impact topics that would involve greater than minor impacts.

Under alternative B, the continued irrigation of the shade trees and lawns at Frijole Ranch would have a minor to moderate, long-term, adverse impact on vegetation because it could encourage growth of non-native

species. Minor to moderate, long-term, adverse impacts on access would result from closing the road to the Salt Basin Dunes parking area, eliminating camping except in the backcountry, and eliminating horse use. For some visitors, a major, long-term, adverse impact to their experience would result from eliminating camping except in

the backcountry and eliminating horse use. Lack of administrative space would result in a moderate to major, long-term, adverse impact on management and administration. Moderate, long-term, adverse impacts would occur on the maintenance aspect of operations because it would impede the ability of the staff to manage the park.

## ALTERNATIVE C

### NATURAL RESOURCES

#### Soils

Many of the impacts of alternative C on soils would be the same as for the no action alternative. Specifically, soil disturbance from ongoing use and maintenance of park facilities would have minor, adverse, long-term impacts. Pedestrian traffic and its related soil erosion would result in minor, long-term, adverse impacts. Impacts of past development, such as the creation of impervious surfaces, the diversion of precipitation from natural drainages, and the compaction of soils, would continue to be long-term, adverse, and minor.

Actions associated with alternative C would disturb about 250 acres of soil throughout the park. Much of this includes new or upgraded roads where some regrading and filling would be needed so that the roads would shed water more easily. Some of the soils in other areas have been previously disturbed, but many are in undeveloped areas.

All sites with soil disturbance would undergo accelerated wind and water erosion, at least temporarily, until drainage structures were fully operational and vegetation had recovered in cleared areas that were not converted to impervious surfaces.

During construction, the National Park Service would require the use of best management practices to prevent soil loss. For example, this would include installing silt fences, conserving available organic matter by retaining and replacing topsoil, and requiring prompt revegetation. However, the soils of the area have low resilience to disturbance, and the aridness of the area would increase the time required for vegetation to become established (if it did become established). During construction, the short-term impacts on soils would be

adverse and minor. The long-term, adverse impacts associated with most of the new development would be minor.

Trail rehabilitation and realignment in alternative C would reduce soil erosion and trail maintenance in problem areas. During implementation, the short-term impacts on soils would be adverse and minor. Long-term impacts in these areas would be beneficial.

Certain soils associated with the proposed road from the west boundary to Salt Basin Dunes activity center that would be disturbed would require special attention. This area has unique soil properties that also result in important vegetation and/or geologic resources. The actions of alternative C in this area would result in moderate, long-term, adverse impacts.

This roadway would impact about 2.5 miles, of which about 1.5 miles already are graded and graveled. Most of the roadway would be along old roads previously established by ranching activities, but upgrading the road for visitor use would impact additional areas along the roadway. The potential for impacts on cryptobiotic soil stability would be high.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact soil resources would be the same as those described for alternative A. These developments have resulted and would continue to result in long-term, moderate to major, adverse impacts on soil resources. The actions associated with alternative C would have a negligible, long-term contribution to these cumulative impacts on soil resources.

**Conclusion.** Many impacts of alternative C on soils would be the same as for the no action alternative. Construction activities on most of the approximately 250 acres would result in short-term, adverse, minor impacts on soils. The long-term impacts from developing new facilities at most sites would

be adverse and minor in intensity. The long-term impacts of trail rehabilitation and realignment would be beneficial. Because of unique soil properties that also result in important vegetation and/or geologic resources, disturbances along the proposed road from the west boundary to Salt Basin Dunes would have moderate, long-term, adverse impacts.

Regionally, cumulative impacts on soils would be moderate to major, long-term, and adverse. This alternative would contribute a very small increment to these cumulative impacts.

### **Plant Communities and Vegetation**

Many of the impacts of alternative C on plant communities and vegetation would be the same as those described for the no action alternative. Specifically, maintenance and ongoing visitor use would have negligible to minor, long-term, adverse effects on vegetation. Continued irrigation of the shade trees and lawns at Frijole Ranch would maintain the growth of unnaturally lush vegetation and allow exotic species to flourish, a minor to moderate, long-term, adverse impact. The proposed boundary change would have negligible impacts on vegetation, and beneficial impacts could result from arrangements that protected vegetation and plant communities outside the park.

Actions of alternative C would permanently remove about 250 acres of vegetation throughout the park. Because of the relatively small area involved (about 0.6 percent of the park), the intensity of the long-term, adverse impact on native vegetation would be minor.

During and after construction, the National Park Service would require the use of the best management practices to minimize impacts on vegetation and plant communities that were described in the preferred alternative. As a result, while the short-term impacts of construction would be minor to moderate and adverse, the long-

term impact on restored areas would be minor.

The approach of alternative C of eradicating target invasive species of exotic plants throughout the park and implementing more strict prevention measures would result in long-term beneficial impacts on native vegetation and plant communities.

Expanding horse use to include overnight use in all zones would result in more grazing of native vegetation by horses, and increased transport of hay that might contain the seeds of exotic invasive species. More aggressive monitoring and mitigation measures would help to control the spread of exotic plant species, but a minor, long-term, adverse impact would occur throughout the park, and could be moderate along trails and other areas where horse use was concentrated.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact vegetation and plant communities would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, moderate to major, adverse impacts on native vegetation and plant communities. The actions associated with alternative C would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative C on vegetation and plant communities would be the same as for the no action alternative. In addition, there would be long-term, minor, adverse impacts from the permanent removal of about 250 acres of native vegetation from sites that would be occupied by new development; minor to moderate, adverse, short-term impacts and minor, adverse, long-term impacts related to construction; and minor to moderate, long-term, adverse impacts from allowing overnight horse use throughout the park. Long-term beneficial impacts would result from more aggressive control of invasive, exotic plants.

Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on vegetation. This alternative would contribute a very small increment to these cumulative impacts.

### **Wildlife**

Many of the impacts of alternative C on wildlife would be the same as those described for the no action alternative. Specifically, past development that resulted in wildlife habitat loss and fragmentation, and ongoing wildlife disturbances by human activities would continue to have negligible to minor, adverse, long-term impacts on wildlife. Collisions of vehicles with wildlife would continue to have in a minor, long-term, adverse impact. The proposed boundary change would have negligible impacts on wildlife, and beneficial impacts could result from arrangements that protected wildlife resources outside the park.

Actions of alternative C would permanently remove about 250 acres of wildlife habitat throughout the park. Because of the relatively small area involved (about 0.6 percent of the park), the intensity of the long-term, adverse impact on wildlife would be minor.

During construction, some smaller animals might be killed or forced to relocate to areas outside the construction zones. Larger animals would probably avoid construction sites and would not be at direct risk for increased mortality. Overall, populations of affected species would decrease slightly during construction, a short-term, minor, adverse effect. Once construction was completed and construction sites were restored, the long-term impacts on wildlife in these areas would be negligible.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact wildlife would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term,

moderate to major, adverse impacts on wildlife. The actions associated with alternative C would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative C on wildlife would be the same as for the no action alternative. In addition, there would be minor, adverse, short-term impacts related to construction and long-term, minor, adverse impacts from the permanent removal of about 250 acres of wildlife and habitats from sites that would be occupied by new development.

Cumulatively, there would continue to be moderate to major, long-term, adverse impacts on wildlife. This alternative would contribute a very small increment to these cumulative impacts.

### **Geologic Resources**

Most impacts of alternative C on geologic resources would be the same as those described for the no action alternative. Specifically, this alternative would have negligible impacts on such geologic processes as rock weathering, mass wasting, dune formation, and the development of sinkholes. Long-term, adverse impacts of negligible to minor intensity would result from continued park use and operation, including trail use and maintenance and use of caves. The proposed boundary change would have negligible impacts on geology, and beneficial impacts could result from arrangements that protected geological resources outside the park.

Development activities on about 250 acres could indirectly impact geologic processes by modifying surface drainage patterns that could impact groundwater and its discharge to ephemeral streams. Careful siting to, for example, route existing drainages around new development, control runoff from newly impervious surfaces, and minimize erosion, would reduce the impacts of development activities. As a result, the intensity of the adverse long-term impacts would be minor.



Construction of water crossings over McKittrick Creek would have a beneficial, long-term effect because it could allow the precipitation of the natural travertine formations. However, the bridge construction could damage the underlying travertine beds and could weaken the banks above the stream. Consequently, a major flood in the canyon could cause greater damage because the weak areas and bridges would be more susceptible to washing away. These impacts would be adverse and moderate in the short- and long-term.

Upgrading the utility infrastructure in McKittrick Canyon and Pratt Cabin could inhibit travertine formation, which would alter the natural flow regime and could cause downstream impacts, decrease groundwater recharge, and encourage stream migration. Stream migration would impact the flora and fauna of the canyon and could increase maintenance costs of the utility corridor or other infrastructure within the canyon. These impacts could be mitigated by limiting the scale and design of any facilities. These long-term, adverse impacts would be minor to moderate in intensity.

Development activities in the Salt Basin Dunes area could alter sand dune formation and dune stability. These impacts would be adverse, long-term, and minor to moderate.

Alternative C would strive to enhance protection and understanding of specific stratotype and fossil locations by developing minimum impact visitor use education programs. Beneficial impacts could result both within and outside the park by improving visitor education about this interesting and limited resource. However, long-term, minor to moderate, adverse impacts also could occur because more people would be aware of the significance and locations of the park's reference stratotypes, which would increase the exposures of the areas to vandalism or unauthorized sample collecting.

**Cumulative Effects.** Past, current, and foreseeably future actions within and

outside the park that impact geologic resources would be the same as those described for alternative A. Long-term, adverse impacts on the near-surface geology from these developments are localized and range in intensity up to moderate.

Cumulative impacts from these developments on geologic formations that are more than 50 feet from the surface have been negligible. Alternative C would contribute only very slightly to near-surface cumulative impacts on geologic resources and would have negligible effects on deeper formations.

**Conclusion.** Many of the impacts of alternative C on geologic resources would be the same as for the no action alternative. In addition, there would be indirect, long-term, minor, adverse impacts on geology from changes in drainage patterns on and around the approximately 250 acres that would be occupied by new development; indirect, long-term, minor to moderate, adverse impacts from upgrading the utility infrastructure in McKittrick Canyon and Pratt Cabin; and long-term, minor to moderate, adverse impacts on sand dune formation and dune stability. Water crossings over McKittrick Creek would beneficially allow precipitation of natural travertine formations but could result in moderate, adverse, short- and long-term impacts during construction and major floods. Development in the Salt Basin Dunes area could alter sand dune formation and dune stability, resulting in adverse, long-term, minor to moderate impacts. Visitor use education programs would have long-term, minor to moderate, adverse impacts relating to increased loss of the park's reference stratotypes and benefits from better education of visitors.

The cumulative impacts on near-surface geologic resources would be long-term and adverse, and locally could be of moderate intensity. This alternative would contribute a very small increment to these cumulative impacts.

### Paleontological Resources

Many of the impacts of alternative C on paleontological resources would be the same as those described for the no action alternative. Specifically, this alternative would have adverse, minor, long-term impacts because of hiking trail use and use of caves. Indirect beneficial impacts would result from activities that exposed fossils in the park for research and visitor interpretation. The proposed boundary change would have negligible impacts on paleontological resources, and beneficial impacts could result from arrangements that protected paleontological resources outside the park.

The proposed low-country camping area below the eastern escarpment is in an area with a high potential for paleontological resources. It might be possible to site the new camping facility in an area of low paleontological sensitivity and to avoid paleontological resources. If paleontological resources could not be avoided, the impacts could be mitigated, such as by collecting or stabilizing *in situ* fossils that might otherwise be destroyed or damaged. As a result, the hike-in camping area would have a minor, adverse, long-term impact on paleontological resources.

Improvement of the McKittrick Nature Trail would cause minor, adverse, long-term impacts on paleontological resources. While salvage mitigation efforts could reduce these impacts, the intensity would remain minor.

Constructing new trails, widening trails, and redeveloping abandoned roads would have adverse, minor, long-term effects on paleontological resources. These actions could cause exposure of new fossils and, possibly, destruction of fossils currently exposed. Because of the density of fossil resources in the area of Smith Spring, impacts from trail improvement would have to be mitigated to reduce the intensity of the adverse, long-term impact to minor.

Alternative C would strive to enhance protection and understanding of paleontological resources by developing minimum impact visitor use education programs. Beneficial impacts could result both within and outside the park by improving visitor education about this interesting and limited resource. However, long-term, minor to moderate, adverse impacts also could occur because alternative C would provide greater access for visitors throughout the park, while the education program would make more people aware of the significance and locations of the park's fossil reference stratotypes. Together, these features could increase vandalism or unauthorized fossils collecting.

Horses impact fossils in park trails because horseshoes grind away the limestone that composes the fossils and rocks. This alternative's increased use of horses throughout the park and its possible park use by commercial packers or a horse concession would have an adverse, moderate, long-term effect.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact paleontological resources would be the same as those described for alternative A. Long-term, adverse impacts on paleontological resources in the near-surface and in caves from these developments have been localized and range in intensity up to moderate. Cumulative impacts from these developments on paleontological resources that are more than 50 feet from the surface (other than in caves) have been negligible. Alternative C would contribute only very slightly to cumulative impacts on paleontological resources in the near-surface and in caves and would have negligible effects on deeper resources.

**Conclusion.** Many of the impacts of alternative C on paleontological resources would be the same as for the no action alternative. In addition, long-term, minor or moderate, adverse impacts on

paleontological resources would result from establishing a low-country camping area below the eastern escarpment; improving the McKittrick Nature Trail and Smith Spring Trail; constructing new trails, widening trails, and redeveloping abandoned roads; increasing the potential for vandalism or unauthorized fossil collecting; and increasing the use of horses. Visitor use education programs would provide a beneficial impact.

The cumulative impacts on paleontological resources in the near-surface and in caves would be long-term and adverse, and locally could be of moderate intensity. This alternative would contribute a very small increment to these cumulative impacts.

## CULTURAL RESOURCES

### Archeological Resources

Many of the impacts of alternative C on archeological resources would be the same as those described for the preferred alternative. Specifically, few if any adverse effects would be anticipated from existing trails; picnic, camping, and parking areas; and use of caves. Surveys and avoidance would ensure that most trail maintenance would have no adverse effects on archeological resources. If significant archeological resources could not be avoided, the effects would be adverse and a memorandum of agreement would be negotiated with the Texas state historic preservation officer regarding how the adverse effects would be mitigated.

Alternative C would result in new facilities on about 250 acres within the park, plus construction disturbances on additional lands surrounding the new facilities. Other park areas that still have evidence of past disturbance would be restored.

Archeological surveys would precede any ground disturbance associated with any of these activities. Because national register-listed or -eligible archeological resources would be avoided to the greatest extent

possible, no adverse effects on archeological resources would be anticipated. If, however, significant archeological resources could not be avoided, the effects on such resources would be adverse, and an appropriate mitigation strategy would be developed in consultation with the Texas state historic preservation officer and, if necessary, associated American Indians.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact archeological resources would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on archeological resources. The actions associated with alternative C would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative C on archeological resources would be the same as for the preferred alternative. There could be additional adverse effects from the construction of new facilities on about 250 acres and from site restoration.

Cumulatively, there would continue to be adverse effects on the region's archeological resources. This alternative would contribute a very small increment to these cumulative impacts.

### Historic Structures

Many of the impacts of alternative C on historic structures would be the same as those described for the no action alternative. Specifically, stabilization or preservation efforts and visitor use of historic structures would result in few if any adverse effects.

In alternative C, rehabilitation would be included in the activities (along with stabilization, preservation, and regular maintenance) that would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, and 1995b). As a result, there would be no adverse effects on the park's historic

structures from any of this alternative's stabilization, preservation, or rehabilitation efforts.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact historic structures would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on historic structures. The actions associated with alternative C would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative C on historic structures would be the same as for the no action alternative. No adverse effects on the park's historic structures would result from any of this alternative's stabilization, preservation, or rehabilitation efforts.

Cumulatively, there would continue to be adverse effects on the region's historic structures. This alternative would contribute a very small increment to these cumulative impacts.

### Cultural Landscapes

Many of the impacts of alternative C on cultural landscapes would be the same as those described for the no action alternative. Specifically, there would be no adverse effect associated with the current rehabilitation of the Frijole Ranch house's cultural landscape, and ongoing use and maintenance at the national register-listed Frijole Ranch and Pinery cultural landscapes.

Improvements to the interpretive walk near the Pinery ruins would create a minor intrusion in this national register-listed landscape's historic scene. This action would be designed and constructed in consultation with the Texas state historic preservation officer. Before rehabilitation was implemented for park cultural landscapes associated with Williams Ranch and Ship-on-the-Desert, cultural landscape reports would be prepared for each property.

Conformance with these reports would ensure that rehabilitation of the landscapes would be undertaken in accordance with standards and guidelines from the Secretary of the Interior (1983, 1995a, 1995b). As a result, there would be no adverse effects on either landscape.

Installing an enlarged, upgraded utility infrastructure at Ship-on-the-Desert would have little or no effect on the existing topography, spatial organization, or land use patterns of the cultural landscapes. Most of the utilities would be installed underground, and the disturbed ground would be restored to its pre-construction contour and condition. No adverse effects on the potential cultural landscape would be anticipated.

Alternative C would not include rehabilitation or other actions for any of the other eight potential cultural landscapes in the park. Within these landscapes, the National Park Service would not perform any construction or removal of any structures or facilities that could potentially alter the character-defining features (topography, vegetation, circulation features, spatial organization, and land use patterns) of the landscapes. As a result, no adverse effects would be anticipated.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact cultural landscapes would be the same as those described for alternative A. These actions have resulted and would continue to result in adverse effects on cultural landscapes. The actions associated with alternative C would contribute a very small increment to the cumulative impacts.

**Conclusion.** Many of the impacts of alternative C on cultural landscapes would be the same as for the no action alternative. The walkway improvements near the Pinery ruins could have a minor adverse effect on the Pinery's cultural landscape. Other aspects of alternative C would result in no

adverse effects on the park's cultural landscapes.

Cumulatively, there would continue to be adverse effects on the region's cultural landscapes. This alternative would contribute a very small increment to these cumulative impacts.

### **Ethnographic Resources**

Many impacts of alternative C on ethnographic resources would be the same as those described for the no action alternative. Specifically, visitors using many areas of the park would have minor adverse effects on American Indians observing sacred rituals or seeking solitude to practice traditional beliefs. The alternative would have negligible impacts on visitor patterns of viewing the Our Lady of Guadalupe image. Impacts from increased park staff knowledge about indigenous plants would be beneficial and long-term.

This alternative would increase use of the Salt Basin Dunes area by upgrading the road to provide use by low-clearance vehicles and by constructing new facilities, including a contact station, ranger staff residence, parking area, trailhead, comfort station, and campground about a mile from the dunes. Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact ethnographic would be the same as those described for alternative A. These actions have resulted and would continue to result in long-term, minor to moderate, adverse impacts on ethnographic resources. The actions associated with alternative C would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

**Conclusion.** Many impacts of alternative C on ethnographic resources would be the same as those associated with alternative A.

Increased park-related use of the sand dunes would result in moderate, adverse, long-term impacts on the sensitivities of the Tigua Indians of Ysleta del Sur Pueblo.

Cumulatively, there would continue to be adverse effects on the region's ethnographic resources. This alternative would result in a minor to moderate, long-term, adverse contribution to the cumulative impacts.

### **Museum Collections**

The park's museum collections would continue to be adequately inventoried, accessioned, and protected according to NPS standards. However, more space for curation, storage, and research would be needed in the future. During the life of the general management plan, much of the park's museum collections would be moved to a new facility outside of the park that was jointly managed with a research and education institution, and housed under state-of-the-art museum standards for fire detection and suppression; security; temperature and humidity control; and curation, storage and research space. Providing more space for curation, storage, and research in this offsite facility would have a negligible impact compared to the offsite approach that would be employed in the no action alternative.

The utmost care would be exercised during the packing, moving, and unpacking of all collections. Therefore, potential impacts on the park's museum collections associated with the risk involved in moving artifacts, specimens, and archives would be negligible compared to the no action alternative. Moving a part of the park's museum collections to a facility outside the park would result in the same inconveniences as the no action alternative for park staff who needed to use the collections for research or study, and would result in a negligible impact.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact museum

collections would be the same as those described for alternative A.

**Conclusion.** Compared to the no action alternative, alternative C would have negligible impacts on museum collections.

## VISITOR EXPERIENCE AND UNDERSTANDING

### Access, Activities and Destinations, and Scenic Views

**Access.** Long-term beneficial impacts on automobile access would result from additional parking at several sites throughout the park and extensive road improvements at and around the Salt Basin Dunes and Williams Ranch. Elsewhere in the park, impacts on access by roads would be negligible.

Long-term, beneficial impacts on hiking access would result from new or improved trailheads, improved signage, additional trails for use by the physically challenged, the development of up to 37 additional miles of trails in the park's interior, and the possible addition of other primitive trails to the park's inventory.

Long-term, beneficial impacts on horseback access would result from allowing overnight horse use on some trails in all zones.

Potentially, the increase in visitor use that would result from access improvements would have minor, long-term, adverse impacts on those visitors who desire more solitude.

**Activities and Destinations.** The construction of a new campground near Pine Springs that was designed for recreational vehicles and groups would result in an improved camping experience for these visitors. The new group picnic area near Pine Springs would serve a visitor segment that currently is not addressed by any of the facilities at the park.

The landscape in the Pine Springs area would have a more natural appearance

because of the removal of recreational vehicles from the trailhead parking lot. This also would allow hikers and picnickers to use the trailhead parking lot for its intended purpose. The improved interpretive walk at the Pinery would create improved interpretation that could attract more visitors to this part of the Pine Springs complex.

The new, hike-in campground below the eastern escarpment would provide a backcountry experience to visitors who formerly were not able to participate in this activity because of the strenuous hike that is required to access other backcountry sites.

At McKittrick Canyon, rehabilitating the Pratt Cabin and cultural landscape and operating the area as a visitor gateway would provide an interesting, theme-related, enjoyable setting with quality interpretation.

Operating the Dog Canyon area as a visitor gateway with a wider variety and number of day-use and overnight opportunities would enhance the attractiveness of the northern part of the park as a destination.

West of the Salt Basin Dunes, new development consisting of a contact station, ranger station, parking area, trailhead, comfort station, and campground, would add activities throughout the area and enhance the attractiveness of the northwest part of the park as a destination.

The attractiveness of the Williams Ranch area as a destination would be enhanced by upgrading the road, rehabilitating the Williams Ranch house interior and cultural landscape, improving and expanding the exhibits, and expanding the parking lot.

Improved and expanded exhibits at Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, the Salt Basin Dunes, and wayside locations throughout the park would enhance interpretation as an activity and make these sites more attractive as destinations. The exhibits would also make visitors more aware of the destinations and

activities that are available throughout the park.

Expansions of the public corrals at Frijole Ranch and Dog Canyon and consideration of operating these facilities for use by commercial packers or a horse concession, as well as visitor-owned horses, could substantially increase the number of visitors who would experience the backcountry by horse.

Rehabilitating the Ship-on-the-Desert structure and landscape and using them as the centerpiece for an expanded research and education program that could include cooperative partners in additional facilities would improve the enjoyment of many of its users by providing better facilities and would enhance its use as a destination.

All of these would result in long-term, beneficial impacts.

Potentially, the increase in visitor use that would result from these improvements would have minor, long-term, adverse impacts on those visitors who desire more solitude.

**Scenic Views.** Moving the location for recreational vehicle camping to an location outside the Pine Springs viewshed would have a long-term, beneficial impact on scenic views in the area.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact access, activities and destinations, and scenic views would be the same as those described for alternative A. alternative C would have a negligible effects on cumulative impacts compared to the no action alternative.

**Conclusion.** Alternative C would have beneficial, long-term effects on access, activities and destinations, and/or scenic views at numerous sites within and associated with the park, including Pine Springs, Frijole Ranch, McKittrick Canyon, Dog Canyon, Salt Basin Dunes, Williams Ranch, and Ship-on-the-Desert. There could

be minor, long-term, adverse impacts on visitors who desire more solitude. Cumulative impacts would be the same as the no action alternative.

### **Interpretation, Education, and Orientation**

**Interpretation.** Improvements to the Pine Springs visitor center and McKittrick Canyon and Dog Canyon contact stations, the addition of a new contact station at Salt Basin Dunes, and providing a living history working ranch at Frijole Ranch would have long-term, beneficial impacts on visitor understanding and appreciation of park themes and significance. Average length of stay in the facilities would likely increase with expanded interpretive media, which would cause long-term, beneficial impacts.

Waysides and other exhibits that were installed at several locations would provide both orientation and interpretive information to visitors throughout the park. The long-term benefit would be greatest for visitors who do not go to the visitor center or who arrive outside of regular park hours.

**Education.** Using Ship-on-the-Desert as part of expanded research and educational facilities would have long-term, beneficial impacts on the understanding and appreciation of those participating in residential programs or day-use activities.

Expanded outreach education programs would have long-term, beneficial impacts on program participants, which would include populations that have not traditionally used the park. Increased interaction with regional and national media would enable the National Park Service to provide information to audiences that may not have been seeking, or even been aware of, the opportunities at Guadalupe Mountains National Park.

**Orientation.** Several aspects of alternative C would have beneficial impacts on visitor orientation. These would include enhancement of the contact station at

McKittrick Canyon and Dog Canyon, the new contact station west of the Salt Basin Dunes, additional wayside exhibits distributed more widely throughout the park, targeted interpretive programs and activities, and improved Internet resources.

**Cumulative Effects.** Past, current, and foreseeably future actions within and outside the park that impact interpretation, education, and orientation would be the same as those described for alternative A. Alternative C would have a negligible effects on cumulative impacts compared to the no action alternative.

**Conclusion.** All of the impacts of alternative C on interpretation, education, and orientation would be beneficial. The cumulative impact with other information sources would be negligible.

## THE SOCIOECONOMIC ENVIRONMENT

The impacts of alternative C on the socioeconomic environment would be the same as those described for the preferred alternative. Specifically,

- The planned improvements may increase park visitation, which would benefit regional businesses.
- The effects of changes in staffing levels would be negligible.
- Benefits from new capital projects in the park would be beneficial in the short term and negligible in the long term.
- Effects on housing demand would be negligible.
- Increases in demand for public services would be a long-term, minor, adverse impact but would be offset by the long-term, beneficial impacts from fees, sales and property taxes, and other revenues.
- Cumulative impacts would be the same as described in the no action alternative.

The effects of alternative C may be slightly greater than those of the preferred alternative. However, because the impacts

would be spread over the region, which includes four counties in two states, the intensity of the impacts would not change from those presented for the preferred alternative.

**Conclusion.** Impacts of alternative C on the socioeconomic environment would be the same as those described for the preferred alternative.

## PARK OPERATIONS, FACILITIES, AND EQUIPMENT

The impacts of alternative C on park operations, facilities, and equipment would be the same as those described for the preferred alternative. Specifically,

- Negligible impacts would result from continued use of shared administrative functions at the “town office” in Carlsbad. Continued implementation of operational efficiencies would have a long-term benefit.
- A new, consolidated headquarters complex at the Pine Springs site would result in a long-term, beneficial impact.
- Enhanced water storage at Dog Canyon would provide a long-term, beneficial impact for fire protection and visitor use.
- The ability to reclaim two housing units at Pine Springs for their original purpose would have a long-term, beneficial impact.
- Increased maintenance requirements associated with the new facilities would have a long-term, moderate, adverse impact on park operations.

Cumulative impacts would be the same as described in the no action alternative and this alternative’s contribution would be slight.



## **RELATIONSHIP OF LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The intent of this determination is to identify whether alternative C would result in trading the immediate use of the land for any long-term management possibilities or the productivity of park resources that would affect future generations. It is intended to determine whether alternative C would be a sustainable action that could continue over the long-term without environmental problems.

Alternative C would be a sustainable action that would not change the use of Guadalupe Mountains National Park nor affect the long-term productivity of lands affected by its operation for future generations.

The National Park Service understands that the Tigua Indians of Ysleta del Sur Pueblo would prefer that visitors not be allowed access to the sand dunes. Alternative C proposes road and trail improvements that would allow people to more easily access the area, and overnight camping in the vicinity would extend the length of some visitor stays. Impacts on Tigua sensitivity to the increased number of visitors in the sand dunes area would be moderate, adverse, and long-term.

## **IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

The intent of this evaluation is to identify whether this alternative would result in effects that could not be changed over the long term or would be permanent. An effect on a resource would be irreversible if the resource could not be reclaimed, restored, or otherwise returned to its condition before the disturbance. Irretrievable commitments of resources are those that are lost for a period of time.

Impacts on soils associated with some facility construction, such as the consolidated headquarters building, would be an irreversible commitment of resources because the soil profile would be permanently altered at the building site. There would be an irreversible loss of wildlife in the park resulting from collisions with vehicles. There would be an irreversible loss of paleontological resources from increased trail development and use and the potential for increased illegal activities such as vandalism or unauthorized collecting.

There would be an irretrievable loss of vegetation and native plant communities, and wildlife and their habitat associated with site clearing for some of the new development in the park.

## **UNAVOIDABLE ADVERSE IMPACTS**

The intent of this determination is to identify whether this alternative would result in impacts that could not be fully mitigated or avoided. The focus of this assessment is on impact topics that would involve greater than minor impacts.

There would be minor to moderate, adverse impacts on soils from construction, and moderate, long-term, adverse impacts associated with overnight horse use. The continued irrigation of the shade trees and lawns at Frijole Ranch would have a minor to moderate, long-term, adverse impact on vegetation because it could encourage growth of non-native species. There would be long-term, minor to moderate, adverse impacts on geologic resources from upgrading the utility infrastructure in McKittrick Canyon and Pratt Cabin; from development in the Salt Basin Dunes area that could alter sand dune formation and dune stability; and from visitor education programs that could lead to more vandalism and unauthorized collection from the park's reference stratotypes because more people would be aware of these resources. Long-term, minor or moderate, adverse impacts on paleontological resources would result

from establishing a low-country camping area below the eastern escarpment; improving the McKittrick Nature Trail and Smith Spring Trail; other trail improvements; increased potential for illegal activities, including vandalism and unauthorized collection; and increased use of horses. An

increase in the continued park-related use of the sand dunes would result in moderate, long-term, adverse impacts on ethnographic resources.

## CHAPTER 5: CONSULTATION AND COORDINATION





## PUBLIC AND AGENCY INVOLVEMENT

The *General Management Plan / Environmental Impact Statement* for Guadalupe Mountains National Park represents thoughts of the National Park Service, other agencies, American Indian groups, and the public. Consultation and coordination among these groups were vitally important throughout the planning process.

The public had three primary avenues by which it participated during the development of the plan. These included participation in public meetings, responses to newsletters, and comments on the NPS Internet site.

### PUBLIC MEETINGS AND NEWSLETTERS

Public meetings and three newsletters kept the public informed and involved in the planning process for Guadalupe Mountains National Park. A mailing list consisted of members of governmental agencies, nongovernmental groups, businesses, legislators, local governments, and interested citizens.

The notice of intent to prepare an environmental impact statement was published in the *Federal Register* on February 23, 2000.

More than 150 people commented in writing on the first newsletter (April 2000) and more than 200 comments were received at the six public meetings held at Van Horn, Midland-Odessa, Queen, Dell City, Carlsbad, and El Paso in April 2000. A total of 104 people attended these meetings. A summary of public comments is provided in appendix F.

An alternatives workshop was held at Washington Ranch on November 2, 2000. Thirty individuals representing park neighbors, American Indian tribes, community leaders, and other governmental agencies attended this workshop.

Through these venues, many points of view about future visions for the park and park

management issues were obtained from park neighbors, American Indian tribes, community leaders, government agencies, conservation groups, local citizens, commercial interests, and other interested groups. Although each commenter may have had a different vision of the park, everyone had a common interest in its valuable resources.

Some respondents sought to enhance resource protection by Congressionally designating more wilderness. Others suggested that allowing agriculture (grazing), increasing prescribed fires, and providing more surface water in the park would conserve resources and enhance the habitat for native wildlife. There was a concern for preserving archeological and cultural resources, particularly maintaining historic sites, and protecting the world-class geologic resources.

The most dramatic divergence of opinion was expressed on use and access within the park. Some wanted more facilities and access to serve a wider range of visitors, while others wanted to preserve the diverse resources and sense of solitude with stricter use regulations and more access restrictions. The need for better -developed camping facilities and provisions for greater accessibility on established trails were mentioned.

The value of the park for research was recognized by respondents, especially for geological and paleontological research. Suggestions included creating more outreach and partnership programs. The opportunity for partnerships was noted as a means to enhance educational programs, scientific research, and energy development.

The second newsletter was distributed in May 2001 and described the proposed management zones for the park and the draft alternatives. The few comments received indicated that the zones needed to be

presented in greater detail before interested parties could effectively comment.

A third newsletter, distributed in September 2002, presented the proposed zones and alternatives in greater detail and included maps. Approximately 1,000 newsletters were sent out, and the park received 82 comments in both letters and email. Many people were satisfied with the status quo. About two-thirds of the commenters liked alternative B but wanted caveats or additions. Five commenters preferred alternative A, and six preferred alternative C. Five commenters had no preference among the alternatives. There was little support for having concessioners in the park. There was support for some trail enhancements, removing or relocating the recreational vehicle campground, and providing a new campground for recreational vehicle and tent campers. Some expressed an interest in having a store for basic supplies. There was little support for better access to Williams Ranch. One commenter suggested a road from Williams Ranch to Dell City.

## CONSULTATION WITH OTHER AGENCIES, OFFICIALS AND ORGANIZATIONS

### Section 7 Consultation for Threatened and Endangered Species

On May 10, 1999, a letter was sent to the U.S. Fish and Wildlife Service requesting information on threatened and endangered species, species of concern, and designated critical habitats in Hudspeth and Culberson Counties. A copy of the letter from the U.S. Fish and Wildlife Service that provided this information is provided in appendix G. Should an alternative be selected that would potentially impact the Mexican spotted owl or its habitat, consultation with the U.S. Fish and Wildlife Service would be initiated.

The U.S. Fish and Wildlife Service provided an updated species list on September 23, 2007, which also is found in appendix G. On April 25, 2008, this agency's New Mexico Ecological Service Field Office commented

on the *Draft General Management Plan / Environmental Impact Statement*. They advised that construction during the migratory bird breeding season should be avoided where possible and, therefore, recommended that surveys for presence/absence and nest occupancy be conducted prior to construction during the breeding season. Surveys for owls may need to start as early as February. Reference U.S. Fish and Wildlife Consultation 22420-2008-FA-0032. A copy of this correspondence is located in appendix H: Agency Letters, and Responses to Substantive Comments on the Draft General Management Plan and Environmental Impact Statement.

The Wildlife Habitat Assessment Program of the Texas Parks and Wildlife Department commented on the *Draft General Management Plan / Environmental Impact Statement* on June 16, 2008. They wrote that the Texas Natural Diversity Database indicates numerous rare species, primarily plants, that have been documented at or near the proposed project sites and provided a list of species and a map. This agency recommended that project areas should be surveyed for the presence of rare species before initiating any development projects that involve ground disturbances. A copy of this correspondence is included in appendix H.

### Air Quality and Flood Hazards

A letter was sent to the Texas Natural Resource Conservation Commission (now the Texas Commission on Environmental Quality) regarding general conformity impacts from actions that could be included in the general management plan with 40 *Code of Federal Regulations* Part 93 and Chapter 101.30 of the commission's General Rules. Their reply was that demolition, construction, rehabilitation, or repair projects will produce no significant impact on the ability of the area to meet air quality standards.

For flood hazards, it was determined by the commission from a review of the information

provided that an application for approval of a floodplain development project need not be filed with the commission. Their records show that the community is a participant in the National Flood Insurance Program and, as such, has a Flood Hazard Prevention Ordinance / Court Order (see appendix G).

Region 6 of the U.S. Environmental Protection Agency commented on the *Draft General Management Plan / Environmental Impact Statement* on June 9, 2008. In accordance with their responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act, and the Council on Environmental Quality Regulations for Implementing the National Environmental Policy Act, they commented that the plan would not result in unacceptable impacts or effects on park resources or values. This agency has a “lack of objections” to the proposed action as described in the draft environmental impact statement. A copy of this correspondence is presented in appendix H.

### Section 106 Consultation

Agencies that have direct or indirect jurisdiction over historic properties are required by Section 106 of the National Historic Preservation Act of 1966, as amended (16 *United States Code* 270, *et sequens*) to take into account the effect of any undertaking on properties eligible for listing in the National Register of Historic Places. To meet the requirements of 36 *Code of Federal Regulations* 800, the National Park Service sent letters to the Texas state historic preservation officer and the Advisory Council on Historic Preservation on April 6, 2000, inviting their participation in the planning process. Both offices were sent all of the newsletters with a request for comments.

On April 5, 2011, the State Historic Preservation Officer from the Texas Historical Commission provided comment on the draft plan and preferred alternative. The SHPO concurred that the preferred alternative provides the best management of

cultural resources while providing enhanced interpretive presentations, active management of visitor access and greater day use and overnight opportunities with improved facilities.

### Consultations with Traditionally Associated Tribes

Through ethnographic and ethnohistorical evidence, park staff have identified 13 tribes that at one time or another maintained territory within what is now Guadalupe Mountains National Park in which aboriginal, indigenous culture, including subsistence, was practiced. The tribes are as follows:

- Apache Tribe of Oklahoma
- Comanche Indian Tribe, Oklahoma
- Fort Sill Apache Tribe of Oklahoma
- Hopi Tribe of Arizona
- Jicarillo Apache Tribe of the Jicarilla Apache Indian Reservation, New Mexico
- Kiowa Tribe of Oklahoma
- Mescalero Apache Tribe of the Mescalero Reservation, New Mexico
- Pueblo of Isleta, New Mexico
- Pueblo of Zia, New Mexico
- San Carlos Apache Tribe of the San Carlos Reservation, Arizona
- White Mountain Apache Tribe of the Fort Apache Reservation, Arizona
- Ysleta del Sur Pueblo of Texas
- Zuni Tribe of the Zuni Reservation, New Mexico

These names are given as they appear in the list of federally recognized tribes in the *Federal Register*, volume 65, number 49, March 13, 2000.

The park staff regularly conducts government-to-government relations with those of the park’s traditionally associated tribes who desire to participate. Park staff aim for effective communication and the sharing of information and knowledge about mutual interests in the park, including concerns about park planning and operations and the

management of cultural and natural resources.

In April 2000, the park superintendent sent letters of invitation to consult about the ongoing general management planning process. Two tribes indicated an interest to do so: the Mescalero Apache Tribe and the Ysleta del Sur Pueblo (also known as the Tigua Indian Tribe). American Indian consultation meetings were conducted with these tribes, as well as follow-up telephone calls and written invitations to comment on the draft general management plan.

Park Superintendent Ellis Richard and Chief of Resources Management and Visitor Protection Janice Wobbenhorst met at the Mescalero Apache Cultural Center and later at tribal headquarters on July 12, 2000, with representatives of the Mescalero Apache Tribe, including Tribal Historic Preservation Officer Donna McFadden and Mescalero Apache Cultural Center Curator Ellen Bigrope. The National Park Service planning process was discussed, along with reasons for the need for a new general management plan. The idea of Tribal Council members and elders visiting the park was expressed by the tribe and encouraged by the park. The tribe recognized the need for its members to become more familiar with what is now the park and its resources. The tribe indicated a willingness to address possible future tribal concerns in relation to the park.

On September 20, 2000, Superintendent Ellis Richard and Chief of Resource Management and Visitor Protection Janice Wobbenhorst met at tribal headquarters with representatives of the Tigua Indians of Ysleta del Sur Pueblo, including Governor Albert Alvidrez, Tribal Attorney Robert Truehill, and Dr. Adolph Greenberg, a contracting anthropologist who became the tribal ethnographer after conducting an ethnographic study of Mescalero Apache and Tigua associations with the park. Part of the study method involved Tigua tribal members visiting the park (Greenberg 1996).

The Tigua indicated strong cultural ties to the Salt Basin Dunes and expressed their desire to be involved in the entire general management plan process. The NPS representatives encouraged the Tigua to do so. The Tigua suggested tribal representation on the planning team and the need to continue to meet. The Tigua used the term “whole landscapes” as a focus of their concern with what they said were religious relationships, which the National Park Service interprets as cultural landscapes, a category of cultural resource management for protection and preservation. The Tigua said they wished to see and comment on the range of proposed management alternatives in the draft general management plan, which would be part of the process of American Indian consultations.

Since arriving in April 2004, park Superintendent John Lujan has been in contact with the two American Indian tribes primarily interested in government-to-government American Indian consultations with the park, the Mescalero Apache Tribe and the Tigua Indians of Ysleta del Sur Pueblo. He made assurances about continuing the ongoing dialogue the park has in place with these tribes regarding any concerns they might have on how the park and its resources are being managed.

#### **Consultations for the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)**

Museum collections have been inventoried for items covered by this act, such as human remains, funerary objects, and sacred or other objects of cultural patrimony. Fragmentary human remains and associated funerary objects were found representing some 10 persons, believed to be prehistoric. The federally recognized, affiliated tribes were notified, and a conference was held during November 2000. The remains and objects associated with them were “adopted” by the tribes, with the Mescalero Apache Tribe of the Mescalero Reservation, New Mexico, and the Tigua Indians of the Ysleta del Sur Pueblo of Texas emerging as leaders to deal with the



National Park Service on behalf of the other tribes. Agreement was reached to reinter these remains and objects within the park. A mutually acceptable place has been selected, but internment has not yet occurred. This should take place in the not too far distant future with appropriate ceremonies led by representative American Indians. When this happens, all mandates of the Native American Graves Protection and Repatriation Act should be met.

**COMMENTS ON THE DRAFT  
GENERAL MANAGEMENT PLAN  
AND ENVIRONMENTAL  
IMPACT STATEMENT**

In developing the *General Management Plan* / *Environmental Impact Statement*, the

National Park Service considered public and agency comments on the draft plan and environmental impact statement, plus internal NPS comments, guidance, and direction. This final document addresses substantive comments as necessary, and presents a response to those comments in appendix H.

**FUTURE COMPLIANCE  
REQUIREMENTS**

Table 15 identifies the specific undertakings of the preferred alternative. First listed are the NPS determinations of how those individual undertakings relate to the 1995 programmatic agreement in relation to cultural resources. Other compliance, as appropriate, is also listed.

**Table 15: Future Compliance Required for  
Implementation of Specific Actions, Preferred Alternative**

ACTION IN PREFERRED ALTERNATIVE	COMPLIANCE REQUIREMENT
<p><b>Cultural Resources.</b> Upgrading the road to Williams Ranch but keeping it a single lane with high-clearance vehicular access would be covered by a park-documented categorical exclusion, as would trail and road widening and facility development in previously disturbed ground.</p>	<p>No further state historic preservation officer review necessary.</p>
<p><b>Cultural Resources.</b> Moving camping from the Pine Springs trailhead area to a new, larger campground in the Pine Springs / Frijole Ranch frontcountry area would require archeological surveying. Such surveying would be required also</p> <ul style="list-style-type: none"> <li>for the new picnic area, parking lot, and trailhead at the Frijole Ranch</li> <li>before any increased visitor activity patterns would be permitted in the gypsum sand dunes</li> <li>before any trail and road widening and facility development occurred in previously undisturbed ground</li> </ul> <p>If newly discovered or known sites eligible or listed in the National Register of Historic Places could not be avoided, state historic preservation officer concurrence for mitigation would be required. Rehabilitation of the Ship-on-the-Desert and Pratt Cabin homes of Wallace Pratt would be done with state historic preservation officer consultation, as would that of the Frijole Ranch house.</p>	<p>Future further state historic preservation officer review may be necessary at the design stage of the project.</p>
<p><b>Cultural Resources.</b> Ranching and mining remnants as historic structures and objects reminiscent of past ranching and mining operations would be systematically evaluated for eligibility for listing in the National Register of Historic Places. Those not eligible would be allowed to deteriorate or would be removed for public safety reasons. Consultation and concurrence with the state historic preservation officer would be part of eligibility evaluation and any mitigation that might be required if, for some reason, eligible historic properties could not be preserved.</p>	<p>Further state historic preservation officer review might be necessary before making a decision to allow a particular historic structure or object to deteriorate. Review would be necessary for any mitigation concurrence.</p>
<p><b>Cultural Resources.</b> In accordance with Section 5.2.1 of <i>Management Policies 2006</i> (NPS 2006b), the park will consult with traditionally associated American Indian tribes before permitting any increased visitor use of the gypsum sand dunes area."</p>	<p>Section 5.2.1 of <i>Management Policies 2006</i> (NPS 2006b) states in part that "traditionally associated peoples should be consulted about: . . . proposed NPS actions that may affect the treatment of, use of, and access to cultural and natural resources with known or potential cultural meaning for the groups."</p>
<p><b>Natural Resources.</b> Establishment of new trails or facilities in areas where there may be Mexican spotted owls or habitat would involve consultation with the U.S. Fish and Wildlife Service.</p>	<p>NEPA compliance would be initiated as required. Examples of actions requiring compliance are listed in Chapter 1 under "Implementation of the Plan."</p> <p>Further Section 7 consultation with the U.S. Fish and Wildlife Service would be required.</p>

## AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING A COPY OF THIS DOCUMENT

### FEDERAL AGENCIES

Advisory Council on Historic Preservation  
U.S. Department of Agriculture  
    Lincoln National Forest  
        Guadalupe District, Lincoln National Forest  
    Natural Resources Conservation Service  
U.S. Department of the Interior  
    Bureau of Land Management  
        Carlsbad Field Office  
        Las Cruces Field Office  
        Roswell Field Office  
    National Park Service  
        Amistad National Recreation Area  
        Carlsbad Caverns National Park  
        Big Bend National Park  
        Chamizal National Monument  
        Ft. Davis National Historic Site  
        White Sands National Monument  
U.S. Fish and Wildlife Service  
    Region II, Albuquerque  
    Ecological Services Office, Austin  
    Ecological Services Office, Albuquerque  
U.S. Geological Survey  
U.S. Environmental Protection Agency

### U.S. SENATORS AND REPRESENTATIVES

U.S. House of Representatives  
    Honorable Quico Canseco, Texas  
    Honorable Harry Teague, New Mexico  
    Honorable Sylvestre Reyes, Texas  
U.S. Senate  
    Honorable Jeff Bingaman, New Mexico  
    Honorable John Cornyn, Texas  
    Honorable Kay Bailey Hutchison, Texas  
    Honorable Tom Udall, New Mexico

### STATE AGENCIES

General Land Office, Texas  
New Mexico Department of Game and Fish  
New Mexico Department of Forestry and Conservation

New Mexico Department of Natural Resources  
New Mexico Natural Heritage Program  
Rio Grande Council of Governments, El Paso  
Texas Commission on Environmental Quality (formerly the Texas Natural Resources Conservation Commission)  
Texas Department of Transportation, El Paso Office  
Texas Forest Service  
Texas Historical Commission  
Texas Parks & Wildlife Department  
    Parks Division  
    Wildlife Division  
    Resource Protection Division  
    Texas Natural Heritage Program  
Texas State Historic Preservation Office  
Texas Water Development Board

### STATE OFFICIALS

Texas Single Point of Contact, Governor's office  
Honorable Pete P. Gallego, State Representative, District 74  
Honorable Carlos I. Uresti, State Senator, District 19  
Honorable Rick Perry, Governor of the State of Texas  
Honorable Jose Rodriguez, State Senator, District 29

### AMERICAN INDIAN TRIBES TRADITIONALLY ASSOCIATED WITH PARK LANDS

Apache Tribe of Oklahoma, Anadarko, Oklahoma  
Comanche Tribe, Lawton, Oklahoma  
Ft. Sill Apache Tribe, Apache, Oklahoma  
Hopi Tribe, Kykotsmobi, Arizona  
Isleta Pueblo, Isleta Pueblo, New Mexico  
Jicarilla Apache Tribe, Dulce, New Mexico  
Kiowa Tribe, Carnegie, Oklahoma  
Mescalero Apache Tribe, Mescalero, New Mexico

San Carlos Apache Tribe, San Carlos, Arizona  
White Mountain Apache Tribe,  
White River, Arizona  
Ysleta del Sur Pueblo (Tigua), El Paso, Texas  
Zia Pueblo, Zia Pueblo, New Mexico  
Zuni Pueblo, Zuni, New Mexico

### **CITY AND COUNTY GOVERNMENTS**

County Commissioners, Culberson County  
County Commissioners, Eddy County  
County Commissioners, Hudspeth County  
Judge Manuel Molinar, County Judge,  
Culberson County  
Judge Becky Dean-Walker, County Judge,  
Hudspeth County  
Lyndon McDonald, County Commissioner,  
Precinct 3, Culberson County  
Adrian Norman, County Commissioner,  
Precinct 4, Hudspeth County  
Mayor Pamela Dean, City of Dell City, Texas  
Mayor Dale W. Janway, City of Carlsbad,  
New Mexico  
Mayor Okey D. Lucas, Town of Van Horn,  
Texas

### **LOCAL LIBRARIES**

Carlsbad Public Library  
Dell City Public Library  
Ector County Library  
El Paso Public Library  
New Mexico State University–  
Carlsbad Library  
New Mexico State University–  
Las Cruces Library  
Southwest Texas State University Library  
Sul Ross State University Library  
Texas A & M University Library

Texas Tech University Library  
University of New Mexico Library  
University of Texas-Austin Library  
University of Texas-El Paso Library  
University of Texas-Permian Basin Library  
Van Horn City/County Library

### **ORGANIZATIONS AND BUSINESSES**

Carlsbad Caverns / Guadalupe Mountains  
Association  
Chamber of Commerce, Carlsbad  
Chamber of Commerce, Dell City  
Chamber of Commerce, El Paso  
Chamber of Commerce, Van Horn  
Chihuahuan Desert Research Institute  
Hudspeth Directive for Conservation  
National Audubon Society, Austin  
National Parks & Conservation Association  
Sierra Club, Dallas Chapter  
Sierra Club, El Paso Chapter  
Sierra Club, Houston Chapter  
Southwest Environmental Center, Las Cruces  
The Conservation Fund, Texas  
Program Coordinator  
Texas Nature Conservancy, West Texas  
Programs Office  
The Nature Conservancy of Texas, Austin  
Wilderness Society  
World Wildlife Fund, Las Cruces

### **INDIVIDUALS**

The list is available at park headquarters. A notice was sent to determine who wanted a printed copy of this document or a compact disk version, or who would be willing to look at the document on the Internet.



# APPENDIXES, PREPARERS AND CONSULTANTS, REFERENCES, AND INDEX





## APPENDIX A: LEGISLATION

AREA: GUADALUPE MOUNTAINS NATIONAL PARK, TEXAS

---

AUTHORIZATION

Act of October 15, 1966 (P.L. 89-667, 80 Stat. 920), authorized establishment of Guadalupe Mountains National Park.

ACQUISITION AUTHORITY

Act of October 15, 1966, authorized acquisition by donation, purchase with donated or appropriated funds, exchange, or otherwise. Lands owned by the State or its political subdivisions may be acquired only with the owner's concurrence. The Secretary may acquire approximately 4,667 acres outside the park boundary to exchange for privately owned lands in the park.

Act of December 23, 1975 (P.L. 94-174, 89 Stat. 1029), authorized the exchange of certain lands in order to provide for an adequate entrance road into the McKittrick Canyon section of the park.

ESTABLISHED

September 30, 1972 (F.R. Vol. 37, No. 195, October 6, 1972)

\*BOUNDARY REVISIONS

Act of October 15, 1966, authorized exclusion from the boundary of certain lands should the owner agree to refrain from construction that would adversely affect the park. The owner donated a scenic easement to the United States on July 2, 1968. The boundary was revised to exclude the lands by publication in the Federal Register on August 7, 1970.

Act of December 23, 1975, revised boundary to include lands described.

Act of October 28, 1988 (P.L. 100-541, 102 Stat. 2720), revised the boundary to include additional lands as described.

ACREAGE LIMITATIONS

None

\*STATUTORY CEILING FOR LAND ACQUISITION

Act of October 15, 1966, authorized the appropriation of no more than \$1,800,000 for land acquisition.

Act of October 28, 1988, authorizes the appropriation of necessary funds for land acquisition.

AREA NUMBERS

MIS -7180

PFM -7180

\*Denotes section revised

Revised November 17, 1988



## Public Law 89-667

## AN ACT

October 15, 1966  
[H. R. 698]

To provide for the establishment of the Guadalupe Mountains National Park in the State of Texas, and for other purposes.

Guadalupe Moun-  
tains National  
Park, Texas.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That, in order to preserve in public ownership an area in the State of Texas possessing outstanding geological values together with scenic and other natural values of great significance, the Secretary of the Interior shall establish the Guadalupe Mountains National Park, consisting of the land and interests in land within the area shown on the drawing entitled "Proposed Guadalupe Mountains National Park, Texas", numbered SA-GM-7100C and dated February 1965, which is on file and available for public inspection in the offices of the National Park Service, Department of the Interior.

Notwithstanding the foregoing, however, the Secretary shall omit from the park sections 7 and 17, P.S.L. Block 121, in Hudspeth County, and revise the boundaries of the park accordingly if the owner of said sections agrees, on behalf of himself, his heirs and assigns that there will not be erected thereon any structure which, in the judgment of the Secretary, adversely affects the public use and enjoyment of the park.

Land acquisi-  
tion, etc.

SEC. 2. (a) Within the boundaries of the Guadalupe Mountains National Park, the Secretary of the Interior may acquire land or interests therein by donation, purchase with donated or appropriated funds, exchange, or in such other manner as he deems to be in the public interest. Any property, or interest therein, owned by the State of Texas, or any political subdivision thereof, may be acquired only with the concurrence of such owner.

(b) In order to facilitate the acquisition of privately owned lands in the park by exchange and avoid the payment of severance costs, the Secretary of the Interior may acquire approximately 4,667 acres of land or interests in land which lie adjacent to or in the vicinity of the park. Land so acquired outside the park boundary may be exchanged by the Secretary on an equal-value basis, subject to such terms, conditions, and reservations as he may deem necessary, for privately owned land located within the park. The Secretary may accept cash from or pay cash to the grantor in such exchange in order to equalize the values of the properties exchanged.

Publication in  
Federal Register.

SEC. 3. (a) When title to all privately owned land within the boundary of the park, subject to such outstanding interests, rights, and easements as the Secretary determines are not objectionable, with the exception of approximately 4,574 acres which are planned to be acquired by exchange, is vested in the United States and after the State of Texas has donated or agreed to donate to the United States whatever rights and interests in minerals underlying the lands within the boundaries of the park it may have and other owners of such rights and interests have donated or agreed to donate the same to the United States, notice thereof and notice of the establishment of the Guadalupe Mountains National Park shall be published in the Federal Register. Thereafter, the Secretary may continue to acquire the remaining land and interests in land within the boundaries of the park. The Secretary is authorized, pending establishment of the park, to negotiate and acquire options for the purchase of lands and interests in land within the boundaries of the park. He is further authorized to execute contracts for the purchase of such lands and interests, but the liability of the United States under any such contract shall be contingent on the availability of appropriated or donated funds to fulfill the same.

Preferential  
rights to recon-  
veyance.

(b) In the event said lands or any part thereof cease to be used for national park purposes, the persons (including the State of Texas)

who donated to the United States rights and interests in minerals in the lands within the park shall be given notice, in accordance with regulations to be prescribed by the Secretary, of their preferential right to a reconveyance, without consideration, of the respective rights and interests in minerals which they donated to the United States. Such notice shall be in a form reasonably calculated to give actual notice to those entitled to such preferential right, and shall provide for a period of not less than one hundred and eighty days within which to exercise such preferential right. The preferential right to such reconveyance shall inure to the benefit of the successors, heirs, devisees, or assigns of such persons having such preferential right to a reconveyance, and such successors, heirs, devisees, or assigns shall be given the notice provided for in this subsection.

(c) Such rights and interests in minerals, including all minerals of whatever nature, in and underlying the lands within the boundaries of the park and which are acquired by the United States under the provisions of this Act are hereby withdrawn from leasing and are hereby excluded from the application of the present or future provisions of the Mineral Leasing Act for Acquired Lands (Aug. 7, 1947, c. 513, 61 Stat. 913) or other Act in lieu thereof having the same purpose, and the same are hereby also excluded from the provisions of all present and future laws affecting the sale of surplus property or of said mineral interests acquired pursuant to this Act by the United States or any department or agency thereof, except that, if such person having such preferential right to a reconveyance fails or refuses to exercise such preferential right to a reconveyance as provided in subparagraph (b) next above, then this subsection (c) shall not be applicable to the rights and interests in such minerals in the identical lands of such person so failing or refusing to exercise such preferential right to a reconveyance from and after the one hundred and eighty-day period referred to in subparagraph (b) next above.

Lands withdrawn  
from leasing.

30 USC 351 note.

(d) If at any time in the future an Act of Congress provides that the national welfare or an emergency requires the development and production of the minerals underlying the lands within the boundaries of the national park, or any portion thereof, and such Act of Congress, notwithstanding the provisions of subsection (c) of this section or any other Act, authorizes the Secretary to lease said land for the purpose of drilling, mining, developing, and producing said minerals, the Secretary shall give the persons (including the State of Texas) who donated such minerals to the United States notice of their preferential right to lease, without consideration, all or any part of the respective rights and interests in minerals which they donated to the United States, subject to such terms and conditions as the Secretary may prescribe. Such preferential right shall inure to the benefit of the successors or assigns, and of the heirs or devisees of such persons having such preferential right in the premises. The persons entitled to a preferential right under this subsection shall be given the same notice thereof as persons entitled to preferential rights under subsection (b) of this section. If such person having such preferential right fails or refuses to exercise such right within the time specified in the above notice, the Secretary may thereafter lease the minerals involved to any other person under such terms and conditions as he may prescribe.

Future mineral  
development.

(e) If at any time oil, gas, or other minerals should be discovered and produced in commercial quantities from lands outside of the boundaries of the park, thereby causing drainage of oil, gas, or other minerals from lands within the boundaries of the park, and if the Secretary participates in a communitization agreement or takes other action to protect the rights of the United States, the proceeds, if any, derived from such agreement or action shall inure to the benefit of the

Oil or gas com-  
munitization  
agreement.

donors of the oil, gas, or other minerals, or their successors, heirs, devisees, or assigns.

Administration.

SEC. 4. The Guadalupe Mountains National Park shall be administered by the Secretary of the Interior in accordance with the provisions of the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1-4), as amended and supplemented.

Availability of certain funds.

SEC. 5. Any funds available for the purpose of administering the five thousand six hundred and thirty-two acres of lands previously donated to the United States in Culberson County, Texas, shall upon establishment of the Guadalupe Mountains National Park pursuant to this Act be available to the Secretary for purposes of such park.

Appropriation.

SEC. 6. There are hereby authorized to be appropriated such sums, but not more than \$1,800,000 in all, as may be necessary for the acquisition of lands and interest in lands, and not more than \$10,362,000, as may be necessary for the development of the Guadalupe Mountains National Park.

Approved October 15, 1966.

## Public Law 89-668

October 15, 1966  
[H. R. 8678]

### AN ACT

To establish in the State of Michigan the Pictured Rocks National Lakeshore, and for other purposes.

Pictured Rocks  
National Lake-  
shore, Mich.  
Establishment.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That, in order to preserve for the benefit, inspiration, education, recreational use, and enjoyment of the public a significant portion of the diminishing shoreline of the United States and its related geographic and scientific features, the Secretary of the Interior (hereinafter referred to as the "Secretary") is authorized to take appropriate action, as herein provided, to establish in the State of Michigan the Pictured Rocks National Lakeshore.

Publication in  
Federal Register.

SEC. 2. The area comprising that particular land and water depicted on the map identified as "Proposed Pictured Rocks National Lakeshore, United States Department of the Interior, National Park Service, Boundary Map, NL-PR-7100A, July 1966", which is on file and available for public inspection in the office of the National Park Service of the Department of the Interior, is hereby designated for establishment as the Pictured Rocks National Lakeshore. An exact copy of such map shall be filed for publication in the Federal Register within thirty days following the date of enactment of this Act.

SEC. 3. As soon as practicable after the date of enactment of this Act and following the acquisition by the Secretary of an acreage within the boundaries of the area which in his opinion is efficiently administrable for the purposes of this Act, he shall establish the Pictured Rocks National Lakeshore by publication of notice thereof in the Federal Register.

Pictured Rocks  
National Lake-  
shore Advisory  
Commission.

SEC. 4. (a) There is hereby established a Pictured Rocks National Lakeshore Advisory Commission. Said commission shall terminate ten years after the date the lakeshore is established pursuant to this Act.

(b) The commission shall be composed of five members, each appointed for a term of two years by the Secretary, as follows:

(1) Two members to be appointed from recommendations made by the county in which the lakeshore is situated;

its application insofar as it involved the lands described below. Therefore, pursuant to the regulations contained in 43 CFR, Group 2300, such lands will be at 10 a.m. on November 4, 1972, relieved of the segregative effect of the above-mentioned application.

## OREGON

## WILLAMETTE MERIDIAN

## Revested Oregon and California Railroad Grant Lands

T. 32 S., R. 1 E., W.M.,  
 Sec. 27, NW $\frac{1}{4}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ;  
 Sec. 29, SE $\frac{1}{4}$ ;  
 Sec. 33, W $\frac{1}{2}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ .  
 T. 33 S., R. 1 E., W.M.,  
 Sec. 5, SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ NW $\frac{1}{4}$ ,  
 Government Lots 3 and 4;  
 Sec. 7, E $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , Govern-  
 ment Lot 4;  
 Sec. 9, E $\frac{1}{2}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ ;  
 Sec. 17, NW $\frac{1}{4}$ NW $\frac{1}{4}$ ;  
 Sec. 19, W $\frac{1}{2}$ W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ ,  
 E $\frac{1}{2}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ ,  
 Government Lots 1, 2, 3, and 4;  
 Sec. 21, E $\frac{1}{2}$ , SW $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ ,  
 E $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ ;  
 Sec. 29, E $\frac{1}{2}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$ ;  
 Sec. 30, NE $\frac{1}{4}$ NW $\frac{1}{4}$ , Government Lots 1  
 and 2.  
 Total area—2,930.86 acres.

## Public Domain Lands

T. 33 S., R. 1 E., W.M.,  
 Sec. 4, Government Lot 2;  
 Sec. 8, NW $\frac{1}{4}$ NW $\frac{1}{4}$ ;  
 Sec. 20, NE $\frac{1}{4}$ SE $\frac{1}{4}$ , S $\frac{1}{2}$ SE $\frac{1}{4}$ .  
 Total area—199.94 acres.

The areas described aggregate 3,130.80 acres.

IRVING W. ANDERSON,  
 Chief, Branch of Lands  
 and Minerals Operations.

[FR Doc.72-17125 Filed 10-5-72;8:48 am]

# National Park Service

## GUADALUPE MOUNTAINS NATIONAL PARK, TEX.

### Notice of Establishment

The Act of October 15, 1966 (80 Stat. 920, 16 U.S.C. 283), provides for establishment of the Guadalupe Mountains National Park, consisting of land and interests in land within the area shown on the drawing entitled "Proposed Guadalupe Mountains National Park, Tex.," numbered SA-GM-7100C and dated February 1965, which is on file and available for public inspection in the administrative office of the Guadalupe National Park and in the offices of the National Park Service, Department of the Interior.

The aforesaid act required, however, that the Secretary omit from the park sections 7 and 17, P.S.L. Block 121, in Hudspeth County and revise the park boundaries accordingly if the owner of these sections agreed, on behalf of himself, his heirs, and assigns that no structure would be erected thereon which, in the judgment of the Secretary of the Interior adversely affects the public use and enjoyment of the park. A scenic easement fulfilling the requirements of this provision was obtained by the United States from the owner of these lands and, thereupon, the Secretary omitted them from the park and revised the

boundaries thereof by notice of August 7, 1970, appearing in the FEDERAL REGISTER of August 19, 1970 at page 13222. The boundaries of the park, as so revised, are shown on "Boundary Map, Guadalupe Mountains National Park, Tex.," Drawing No. 166-20,000, 3/70, EPD-WSC.

Section 3(a) of the said act provides that notice of the establishment of Guadalupe Mountains National Park shall be published in the FEDERAL REGISTER when title to all privately-owned land within the park boundary, subject to such outstanding interests, rights, and easements as are not objectionable, with the exception of approximately 4,574 acres which are planned to be acquired by exchange, is vested in the United States, and after the State of Texas has donated or agreed to donate the same to the United States.

Title to all privately-owned land within the boundary of the park is vested in the United States, subject to outstanding interests, rights, and easements which are not objectionable. Moreover, the State of Texas and other owners have donated or agreed to donate the rights and interests it or they may have in minerals underlying lands within the boundaries of the park.

Therefore, notice is hereby given that the Guadalupe Mountains National Park is established.

Dated: September 30, 1972.

NATHANIEL REED,  
 Assistant Secretary of the Interior.

[FR Doc.72-17099 Filed 10-5-72;8:46 am]

### Office of the Secretary

[DES 72-97]

## PROPOSED WILDERNESS CLASSIFICATION FOR GRAND CANYON COMPLEX, ARIZONA

### Notice of Availability of Draft Environmental Statement

#### Correction

Note: FR. Doc. 72-16787 should read as set forth below instead of as it appeared on page 20735 of the Issue for Tuesday, October 3, 1972:

Pursuant to section 102(2)(C) of the National Environmental Policy Act, the Department of the Interior has prepared a draft environmental statement for Proposed Wilderness Classification for Grand Canyon Complex, Ariz., and invites written comment within forty-five (45) days of this notice. Written comment should be addressed to the Director, Western Region or to the Superintendent, Grand Canyon National Park at the addresses given below.

The draft environmental statement considers the designation of 512,870 acres of Marble Canyon and Grand Canyon National Monuments, and Grand Canyon National Park as wilderness.

Copies are available from or for inspection at the following locations:

Western Regional Office, National Park Service, 450 Golden Gate Avenue, Box 36063, San Francisco, CA 94102.

Grand Canyon National Park, Post Office Box 123, Grand Canyon, AZ 86023.

Dated: September 28, 1972.

W. W. LYONS,  
 Deputy Assistant  
 Secretary of the Interior.

## DEPARTMENT OF AGRICULTURE

### Forest Service

#### GILA WILDERNESS

#### Public Hearing

Notice is hereby given in accordance with the provisions of the Wilderness Act of September 3, 1964 (78 Stat. 890-892; 16 U.S.C. 1131-1132) that public hearings will be held, beginning at 9 a.m. on December 15, 1972, in the Fine Arts Auditorium on campus of Western New Mexico University, Silver City, N. Mex., and at 9 a.m. on December 16, 1972, in the Convention Center, Acoma and Zuni Rooms, Albuquerque, N. Mex., on a proposal for a recommendation to be made by the Secretary of Agriculture to the President of the United States for a recommendation to the Congress of a proposed Gila Wilderness. This results from a review of the Gila Primitive Area and adjustments of the boundaries of the Gila Wilderness. The new Wilderness proposal covers 514,678 acres. The proposed Gila Wilderness is located on the Gila National Forest in the counties of Catron and Grant, State of New Mexico.

A brochure containing a map and information about the proposed wilderness may be obtained from the Forest Supervisor, Gila National Forest, 301 West College Avenue, Silver City, NM 88061; or the Regional Forester, 517 Gold Avenue SW., Albuquerque, NM 87101.

Individuals and organizations may express their views by appearing at these hearings or may submit written comments for inclusion in the official record to the Regional Forester, 517 Gold Avenue SW., Albuquerque, NM 87101, until January 16, 1973.

REXFORD A. RESLER,  
 Associate Chief,  
 Forest Service.

OCTOBER 3, 1972.

[FR Doc.72-17165 Filed 10-5-72;8:52 am]

## DEPARTMENT OF COMMERCE

### Bureau of International Commerce

[Case No. 435 (CP-21)]

#### ROMPHIL INTERNATIONAL CORP. AND ROMAN GUNZ

### Order Denying Validated License Export Privileges and Imposing Civil Penalty

In the matter of Romphil International Corp. and Roman Gunz, 1200 Sixth Avenue, New York, NY 10003, respondents, Case No. 435 (CP-21).

Public Law 94-174  
94th Congress

An Act

To authorize an exchange of lands for an entrance road at Guadalupe Mountains National Park, Texas, and for other purposes.

Dec. 23, 1975  
[S. 313]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That subsection (b) of section 2 of the Act approved October 15, 1966 (80 Stat. 920), providing for the establishment of the Guadalupe Mountains National Park in the State of Texas, is amended by adding the following after the third sentence: "In order to provide for an adequate entrance road into the McKittrick Canyon area of the park, the Secretary may accept title to and interests in lands comprising a right-of-way for a road or roads outside of the boundary of the park from United States Highway numbered 62 and 180 to the park boundary, and in exchange therefor he may convey title to and interests in lands comprising a right-of-way from said highway to the boundary which have been donated to the United States. The Secretary may accept cash from or pay cash to the grantor in such exchange in order to equalize the values of the properties exchanged. Lands and interests in lands comprising the right-of-way acquired pursuant to this subsection shall be administered as part of the park."

Guadalupe  
Mountains  
National Park,  
Tex.  
Lands exchange.  
16 USC 283a.

Approved December 23 1975.

---

**LEGISLATIVE HISTORY:**

HOUSE REPORT No. 94-683 accompanying H.R. 1747 (Comm. on Interior and Insular Affairs).

SENATE REPORT No. 94-164 (Comm. on Interior and Insular Affairs).

CONGRESSIONAL RECORD, Vol. 121 (1975):

June 4, considered and passed Senate.

Dec. 1, considered and passed House, amended, in lieu of H.R. 1747.

Dec. 17, Senate concurred in House amendment.

Public Law 95-625  
95th Congress

An Act

To authorize additional appropriations for the acquisition of lands and interests in lands within the Sawtooth National Recreation Area in Idaho.

Nov. 10, 1978

[S. 791]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

National Parks  
and Recreation  
Act of 1978.

SHORT TITLE AND TABLE OF CONTENTS

SECTION 1. This Act may be cited as the “National Parks and Recreation Act of 1978”. 16 USC 1 note.

TABLE OF CONTENTS

- Sec. 1. Short title and table of contents.  
Sec. 2. Definition.  
Sec. 3. Authorization of appropriations.

TITLE I—DEVELOPMENT CEILING INCREASES

Sec. 101. Specific increases.

Agate Fossil Beds National Monument.  
Andersonville National Historic Site.  
Andrew Johnson National Historic Site.  
Biscayne National Monument.  
Capitol Reef National Park.  
Carl Sandburg Home National Historic Site.  
Cowpens National Battlefield Site.  
De Soto National Memorial.  
Fort Bowie National Historic Site.  
Frederick Douglass Home, District of Columbia.  
Grant Kohrs Ranch National Historic Site.  
Guadalupe Mountains National Park.  
Gulf Islands National Seashore.  
Harper's Ferry National Historical Park.  
Hubbell Trading Post National Historic Site.  
Indiana Dunes National Lakeshore.  
John Muir National Historic Site.  
Lands in Prince Georges and Charles Counties, Maryland.  
Longfellow National Historic Site.  
Pecos National Monument.  
Perry's Victory and International Peace Memorial.  
San Juan Island National Historical Park.  
Sitka National Historical Park.  
Statue of Liberty National Monument.  
Thaddeus Kosciuszko Home National Historic Site.  
Tuskegee Institute National Historic Site.  
Whiskeytown-Shasta-Trinity National Recreation Area.  
William Howard Taft National Historic Site.  
Wilson's Creek National Battlefield.

TITLE II—ACQUISITION CEILING INCREASES

Sec. 201. Acquisition ceilings.

Big Cypress National Preserve.  
Buffalo National River.  
Cumberland Island National Seashore.

Sec. 202. Sawtooth National Recreation Area.

## TABLE OF CONTENTS—Continued

## TITLE III—BOUNDARY CHANGES

- Sec. 301. Revision of boundaries.  
     Bent's Old Fort National Historic Site.  
     Cape Cod National Seashore.  
     Chiricahua National Monument.  
     Coronado National Memorial.  
     Eisenhower National Historic Site.  
     Fort Caroline National Memorial.  
     George Washington Birthplace National Monument.  
     Great Sand Dunes National Monument.  
     Gulf Islands National Seashore.  
     Hawaii Volcanoes National Park.  
     John Day Fossil Beds National Monument.  
     Monocacy National Battlefield.  
     Montezuma Castle National Monument.  
     Oregon Caves National Monument.  
     Salem Maritime National Historic Site.  
     Theodore Roosevelt National Memorial Park.  
     Tumacacori National Monument.  
     Tuzigoot National Monument.  
     White Sands National Monument.  
     William Howard Taft National Historic Site.  
     Wind Cave National Park.
- Sec. 302. Maps and descriptions.
- Sec. 303. Acquisition and disposal of lands.
- Sec. 304. Other authorities.
- Sec. 305. Name change ; City of Refuge National Historical Park.
- Sec. 306. Black Hammock Island.
- Sec. 307. Allegheny Portage Railroad National Historic Site and Johnstown Flood National Memorial.
- Sec. 308. Fort Laramie National Historic Site.
- Sec. 309. Fort Union Trading Post National Historic Site.
- Sec. 310. Addition of Dorchester Heights to the Boston National Historical Park.
- Sec. 311. Fort Clatsop National Memorial.
- Sec. 312. Adams National Historic Site, Massachusetts.
- Sec. 313. Addition of Eppes Manor to Petersburg National Battlefield.
- Sec. 314. Addition of Mineral King Valley to Sequoia National Park.
- Sec. 315. Cuyahoga Valley National Recreation Area.
- Sec. 316. Delaware Water Gap National Recreation Area.
- Sec. 317. Golden Gate National Recreation Area.
- Sec. 318. Point Reyes National Seashore.
- Sec. 319. Antietam National Battlefield.
- Sec. 320. Chesapeake and Ohio Canal National Historical Park.
- Sec. 321. Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument.
- Sec. 322. Fire Island National Seashore.
- Sec. 323. Cumberland Island National Seashore.

## TITLE IV—WILDERNESS

- Sec. 401. Designation of areas.
- Sec. 402. Map and description.
- Sec. 403. Cessation of certain uses.
- Sec. 404. Administration.
- Sec. 405. Savings provisions.

TITLE V—ESTABLISHMENT OF NEW AREAS AND  
ADDITIONS TO NATIONAL TRAILS SYSTEM

## Subtitle A—Parks, Seashores, Etc.

- Sec. 501. Guam National Seashore.
- Sec. 502. Pine Barrens Area, New Jersey.
- Sec. 503. Edgar Allan Poe National Historic Site.
- Sec. 504. Saint Paul's Church, Eastchester.
- Sec. 505. Kaloko-Honokohau National Historical Park.
- Sec. 506. Palo Alto Battlefield National Historic Site.
- Sec. 507. Santa Monica Mountains National Recreation Area.
- Sec. 508. Ebey's Landing National Historical Reserve.

## TABLE OF CONTENTS—Continued

TITLE V—ESTABLISHMENT OF NEW AREAS AND  
ADDITIONS TO NATIONAL TRAILS SYSTEM—Continued

## Subtitle A—Parks, Seashores, Etc.—Continued

- Sec. 509. Friendship Hill National Historic Site.
- Sec. 510. Thomas Stone National Historic Site.
- Sec. 511. Maggie L. Walker National Historic Site
- Sec. 512. Crow Creek Village Archeological Site.

## Subtitle B—Trails

- Sec. 551. Amendments to National Trail Systems Act.

## TITLE VI—MISCELLANEOUS PROVISIONS

- Sec. 601. Facilities at Yellowstone National Park.
- Sec. 602. Ridgeland Area study.
- Sec. 603. Preservation of historical and archaeological data.
- Sec. 604. New area studies, general management plans, and contracts.
- Sec. 605. Oak Creek Canyon and Chiricahua National Monument studies.
- Sec. 606. Land and Water Conservation Fund accomplishments reporting date.
- Sec. 607. Hells Canyon National Recreation Area.
- Sec. 608. Irvine Coast-Laguna, California study.
- Sec. 609. Theodore Roosevelt Inaugural National Historic Site.
- Sec. 610. Theodore Roosevelt National Park.
- Sec. 611. Badlands National Park.
- Sec. 612. Albert Einstein Memorial.
- Sec. 613. Pearson-Skubitz Big Hill Lake.
- Sec. 614. Advisory Council on Historic Preservation.

## TITLE VII—WILD AND SCENIC RIVERS ACT AMENDMENTS

## Subtitle A—Addition of Segments

- Sec. 701. Addition of Pere Marquette Segment.
- Sec. 702. Addition of Rio Grande Segment.
- Sec. 703. Addition of Skagit Segments.
- Sec. 704. Addition of Upper Delaware Segment ; special provisions.
- Sec. 705. Addition of Middle Delaware Segment.
- Sec. 706. Addition of the American Segment.
- Sec. 707. Addition of Missouri Segment.
- Sec. 708. Addition of Saint Joe Segments.

## Subtitle B—Studies

- Sec. 721. Designation of the Kern River (North Fork) for study.
- Sec. 722. Designation of the Loxahatchee River for study.
- Sec. 723. Designation of the Ogeechee River for study.
- Sec. 724. Designation of certain segment of the Salt River for study.
- Sec. 725. Designation of the Verde River for study.
- Sec. 726. Designation of the San Francisco River for study.
- Sec. 727. Designation of Fish Creek for study.
- Sec. 728. Designation of Black Creek for study.
- Sec. 729. Designation of Allegheny River for study.
- Sec. 730. Designation of the Cacapon River for study.
- Sec. 731. Designation of the Escatawpa River for study.
- Sec. 732. Designation of the Myakka River for study.
- Sec. 733. Designation of Soldier Creek for study.
- Sec. 734. Designation of Red River for study.
- Sec. 735. Authorization for study.
- Sec. 736. Study period.

## Subtitle C—Authorizations for Funding

- Sec. 751. Eleven Point River.
- Sec. 752. Rogue River.
- Sec. 753. Saint Croix River.
- Sec. 754. Salmon River.
- Sec. 755. Chattooga River.



## TABLE OF CONTENTS—Continued

## TITLE VII—WILD AND SCENIC RIVERS ACT AMENDMENTS—Continued

## Subtitle D—Amendments to Public Law 90-542

- Sec. 761. Technical amendments.  
 Sec. 762. Federal lands; cooperative agreements.  
 Sec. 763. Miscellaneous technical amendments.  
 Sec. 764. Lease of Federal lands.

TITLE VIII—RECOGNITION OF THE HONORABLE  
WILLIAM M. KETCHUM

- Sec. 801. Recognition of the Honorable William M. Ketchum.

## TITLE IX—JEAN LAFITTE NATIONAL HISTORICAL PARK

TITLE X—URBAN PARK AND RECREATION RECOVERY  
PROGRAM

## TITLE XI—NEW RIVER GORGE NATIONAL RIVER

## TITLE XII—FORT SCOTT NATIONAL HISTORIC SITE

## TITLE XIII—REPORT AND BOUNDARY REVISION

- Sec. 1301. Beaverhead or Gallatin National Forests.  
 Sec. 1302. Hampton National Historic Site.

## DEFINITION

SEC. 2. As used in this Act, except as otherwise specifically provided, the term "Secretary" means the Secretary of the Interior.

## AUTHORIZATION OF APPROPRIATIONS

## Effective date.

SEC. 3. Authorizations of moneys to be appropriated under this Act shall be effective on October 1, 1978. Notwithstanding any other provision of this Act, authority to enter into contracts, to incur obligations, or to make payments under this Act shall be effective only to the extent, and in such amounts, as are provided in advance in appropriation Acts.

## TITLE I—DEVELOPMENT CEILING INCREASES

## SPECIFIC INCREASES

Appropriation  
authorizations.

SEC. 101. The limitations on funds for development within certain units of the National Park System and affiliated areas are amended as follows:

## 16 USC 431 note.

(1) Agate Fossil Beds National Monument, Nebraska: Section 4 of the Act of June 5, 1965 (79 Stat. 123), is amended by changing "\$1,842,000" to "\$2,012,000".

(2) Andersonville National Historic Site, Georgia: Section 4 of the Act of October 16, 1970 (84 Stat. 989), is amended by changing "\$1,605,000" to "\$2,205,000 for development.", and by deleting "(March 1969 prices), for development, plus or minus such amounts, if any, as may be justified by reason of ordinary fluctuation in construction costs as indicated by engineering cost indices applicable to the types of construction involved herein."

(3) Andrew Johnson National Historic Site, Tennessee: Section 3 of the Act of December 11, 1963 (77 Stat. 350) is amended by changing "\$266,000" to "\$286,000".

## 16 USC 450qq-4

(4) Biscayne National Monument, Florida: Section 5 of the Act of October 18, 1968 (82 Stat. 1188), is amended by changing "\$2,900,000" to "\$6,565,000".

(5) Capitol Reef National Park, Utah: Section 7 of the Act of December 18, 1971 (85 Stat. 739), is amended by changing "\$1,052,700 (April 1970 prices)" to "\$1,373,000 for development.", and by deleting "for development, plus or minus such amounts, if any, as may be justified by reason of ordinary fluctuations in construction costs as indicated by engineering cost indexes applicable to the types of construction involved herein."

16 USC 273f.

(6) Carl Sandburg Home National Historic Site, North Carolina: Section 3 of the Act of October 17, 1968 (82 Stat. 1154), is amended by changing "\$952,000" to "\$1,662,000".

(7) Cowpens National Battlefield Site, South Carolina: Section 402 of the Act of April 11, 1972 (86 Stat. 120), is amended by changing "\$3,108,000" to "\$5,108,000".

(8) De Soto National Memorial, Florida: Section 3 of the Act of March 11, 1948 (62 Stat. 78), as amended, is further amended changing "\$3,108,000" to "\$5,108,000".

16 USC 450dd  
note.

(9) Fort Bowie National Historic Site, Arizona: Section 4 of the Act of August 30, 1964 (78 Stat. 681), is amended by deleting "\$550,000 to carry out the purposes of this Act.", and inserting in lieu thereof: "\$85,000 for land acquisition and \$1,043,000 for development".

(10) Frederick Douglass Home, District of Columbia: Section 4 of the Act of September 5, 1962 (76 Stat. 435), is amended by changing "\$413,000" to "\$1,350,000".

(11) Grant Kohrs Ranch National Historic Site, Montana: Section 4 of the Act of August 25, 1972 (86 Stat. 632), is amended to read as follows: "SEC. 4. There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act, but not to exceed \$752,000 for land acquisition and not to exceed \$2,075,000 for development."; the additional sums herein authorized for land acquisition may be used to acquire the fee simple title to lands over which the United States has acquired easements or other less than fee interests.

(12) Guadalupe Mountains National Park, Texas: Section 6 of the Act of October 15, 1966 (80 Stat. 920), is amended by changing "\$10,362,000" to "\$24,715,000", and by adding the following new sentence at the end of the section: "No funds appropriated for development purposes pursuant to this Act may be expended for improvements incompatible with wilderness management within the corridor of the park leading to the summit of Guadalupe Peak."

16 USC 283e.

(13) Gulf Islands National Seashore, Florida-Mississippi: Section 11 of the Act of January 8, 1971 (84 Stat. 1967), is amended by changing "\$17,774,000" to "\$24,224,000", and by deleting the phrase "(June 1970 prices) for development, plus such amounts, if any, as may be justified by reason of ordinary fluctuations in construction costs as indicated by engineering costs indices applicable to the types of construction involved herein.", and inserting in lieu thereof "for development."

16 USC  
4592h-10.

(14) Harper's Ferry National Historical Park, Maryland-West Virginia: Section 4 of the Act of June 30, 1944 (58 Stat. 645), is amended further by changing "\$8,690,000" to "\$12,385,000".

16 USC 450bb  
note.

(15) Hubbell Trading Post National Historic Site, Arizona: Section 3 of the Act of August 28, 1965 (79 Stat. 584), is amended by changing "\$952,000" to "\$977,000".

16 USC 461 note.

Public Law 100-541  
100th Congress

An Act

Oct. 28, 1988  
[H.R. 4777]

To modify the boundary of the Guadalupe Mountains National Park, and for other purposes.

Texas. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

SECTION 1. BOUNDARY MODIFICATION.

The first section of the Act entitled “An Act to provide for the establishment of the Guadalupe Mountains National Park in the State of Texas, and for other purposes” (16 U.S.C. 283) is amended—

(1) by changing “in” after “That” to “(a) In”; and

(2) by adding at the end thereof the following:

Public  
information.

“(b) The boundary of Guadalupe Mountains National Park is hereby modified to include the area which comprises approximately 10,123 acres as generally depicted on the map entitled ‘Boundary Proposal’ and dated August 1986, which shall be on file and available for public inspection in the office of the Director of the National Park Service and in the office of the Superintendent of the Guadalupe Mountains National Park.”.

SEC. 2. AUTHORIZATION OF APPROPRIATIONS.

16 USC 283e. (a) PROTECTION OF AREA.—Section 6 of the Act entitled “An Act to provide for the establishment of the Guadalupe Mountains National Park in the State of Texas, and for other purposes” (16 U.S.C. 283) is amended—

(1) by inserting “(a)” after “SEC. 6”; and

(2) by inserting at the end thereof the following:

“(b) In addition to amounts authorized to be appropriated under subsection (a), there is authorized to be appropriated such sums as may be necessary for the construction of a fence to protect the natural and cultural resources of the area added to Guadalupe Mountains National Park by section 2(b).”.

(b) LAND ACQUISITION.—Subsection (a) of section 6 of such Act (as redesignated by subsection (a) of this section) is amended by striking out “sums,” and all that follows through “all,” and inserting in lieu thereof “sums”.

Approved October 28, 1988.

LEGISLATIVE HISTORY—H.R. 4777:

HOUSE REPORTS: No. 100-837 (Comm. on Interior and Insular Affairs).  
CONGRESSIONAL RECORD, Vol. 134 (1988):  
Aug. 8, considered and passed House.  
Oct. 14, considered and passed Senate.



## APPENDIX B: LAWS AND EXECUTIVE ORDERS

### NATIONAL PARK SERVICE ENABLING LEGISLATION

- Act of June 30, 1864, 13 Statute (Stat.) 325, 16 *United States Code* (USC), Section (§)48
- Act of March 1, 1872, 17 Stat. 32, 16 USC §21 *et sequens* (*et seq.*, meaning “and following legislation”)
- Lacey Act of 1900, as amended by Public Law (PL) 97-79, 18 USC Sections (§§)42-44, Title 50 *Code of Federal Regulations* (CFR)
- Act of August 25, 1916 (National Park Service Organic Act), PL 64-235, 16 USC §1 *et seq.*
- Act of June 5, 1920, 41 Stat. 917, 16 USC §6
- Act of February 21, 1925, 43 Stat. 958, (temporary act, not classified)
- Act of May 26, 1930, 16 USC §17-17j
- Act of March 3, 1933, 47 Stat. 1517
- Parks, Parkways, and Recreational Programs Act, June 23, 1936, 49 Stat. 1894, 16 USC §§17k-n
- Act of August 8, 1953, 16 USC §1b-1c
- Act to Improve the Administration of the National Park System, August 18, 1970; PL 91-383, 84 Stat. 825, as amended by PL 94-458, PL 95-250, and PL 95-625; 16 USC § 1a1 *et seq.*
- General Authorities Act, October 7, 1976, PL 94-458, 90 Stat. 1939, 16 USC §1a-1 *et seq.*
- Act amending the Act of October 2, 1968 (commonly called Redwoods Act), March 27, 1978, PL 95-250, 92 Stat. 163, 16 USC §§1a-1, 79a-q
- National Parks and Recreation Act, November 10, 1978, PL 95-625, 92 Stat. 3467; 16 USC §1 *et seq.*
- NPS Resources, Improve Ability to Manage, PL 101-337, 16 USC §19jj
- National Parks Omnibus Management Act of 1998, PL 105-391, Title IV, National Park Service Concessions Management Improvement Act of 1998

### OTHER LAWS AFFECTING THE NATIONAL PARK SERVICE

#### Accessibility

- Americans with Disabilities Act, PL 101-336, 104 Stat. 327, 42 USC §12101
- Architectural Barriers Act of 1968, PL 90-480, 82 Stat. 718, 42 USC §4151 *et seq.*
- Rehabilitation Act of 1973, PL 93-112, 87 Stat. 357, 29 USC §701 *et seq.* as amended by the Rehabilitation Act Amendments of 1974, 88 Stat. 1617

#### Cultural Resources

- American Folklife Preservation Act of 1976, PL 94-201, 89 Stat. 1130, 20 USC §§2101-2107
- American Indian Religious Freedom Act, PL 95-341, 92 Stat. 469, 42 USC §1996
- Antiquities Act of 1906, PL 59-209, 34 Stat. 225, 16 USC §432 and 43 CFR 3
- Archaeological and Historic Preservation Act of 1974, PL 93-291, 88 Stat. 174, 16 USC §469
- Archaeological Resources Protection Act of 1979, PL 96-95, 93 Stat. 712, 16 USC §470aa *et seq.* and 43 CFR 7, subparts A and B, 36 CFR 79
- Executive Order 11593: Protection and Enhancement of the Cultural Environment, 3 CFR 1971
- Executive Order 13007: Indian Sacred Sites, May 24, 1996
- Historic Sites Act, PL 74-292, 49 Stat. 666, 16 USC §§ 461-467 and 36 CFR 65
- Historic Preservation Certifications Pursuant to the Tax Reform Act of 1976, Revenue Act of 1978, Tax Treatment Extension Act of 1980, and Economic Recovery Tax Act of 1981, 36 CFR 67
- Management of Museum Properties Act as amended (July 1, 1955, ch. 259, § 1, PL 84-127, 69 Stat. 242; PL 104-333, div. I, title VIII, § 804(a)(1), Nov. 12, 1996, 110 Stat. 4187) 16 USC §§18f, 18f-2 and 18f-3.

- National Historic Preservation Act as amended, PL 89-665, 80 Stat. 915, 16 USC §470 *et seq.* and 36 CFR 18, 60, 61, 63, 68, 79, 800
- National Trust Act of 1949, PL 81-408, 63 Stat. 927, 16 USC §§468c-e
- Native American Grave Protection and Repatriation Act, PL 101-601, 104 Stat. 3049, 25 USC §§3001-3013
- Presidential Memorandum of April 29, 1994 “Government-to-Government Relations with Native American Tribal Governments,” 59 FR 85
- Protection of Historic and Cultural Properties, Executive Order (E.O.) 11593; 36 CFR 60, 61, 63, 800; 44 FR 6068
- Public Buildings Cooperative Use Act of 1976, PL 94-541, 90 Stat. 2505, 42 USC §4151-4156
- Tax Reform Act of 1976, PL 94-455, 90 Stat. 1916
- World Heritage Convention, 1980, PL 96-515, 94 Stat. 3000

#### Natural Resources

- Acid Precipitation Act of 1980, PL 96-294, 94 Stat. 770, 42 USC §8901 *et seq.*
- Bald and Golden Eagles Protection Act as amended, PL Chapter 28, 54 Stat. 250, 16 USC §§668-668d
- Clean Air Act as amended, PL Chapter 360, 69 Stat. 322, 42 USC §7401 *et seq.*
- Emergency Planning and Community Right-to-Know Act, PL 99-499, 100 Stat. 1725, 42 USC §1101
- Endangered Species Act of 1973, as amended, PL 93-205, 87 Stat. 884, 16 USC §1531 *et seq.*
- Endangered Species Conservation Act of 1969
- Executive Order 11988: Floodplain Management, 42 FR 26951, 3 CFR 121 (Supp 177)
- Executive Order 11990: Protection of Wetlands, 42 FR 26961, 3 CFR 121 (Supp 177)
- Executive Order 11991: Protection and Enhancement of Environmental Quality
- Farmland Protection Policy Act of 1982, PL 97-98
- Federal Cave Resources Protection Act of 1988, PL 94-377, 102 Stat. 4546, 16 USC §4301
- Federal Advisory Committee Act of 1972, PL 92-463, 86 Stat. 770
- Federal Insecticide, Fungicide, and Rodenticide Act, PL 92-516, 86 Stat. 973, 7 USC §136 *et seq.*
- Federal Water Pollution Control Act (commonly referred to as Clean Water Act), PL 92-500, 33 USC §1251 *et seq.* as amended by the Clean Water Act, PL 95-217
- Fish and Wildlife Coordination Act, PL 85-624, 72 Stat. 563, 16 USC §661 *et seq.*
- Flood Disaster Protection Act of 1973, PL 93-234, 87 Stat. 975, 12 USC §24, §1709-1
- Migratory Bird Conservation Act, PL Chapter 257, 45 Stat. 1222, 16 USC §715 *et seq.*
- Migratory Bird Treaty Act of 1918, PL 186, 40 Stat. 755
- National Environmental Policy Act of 1969, PL 91-190, 83 Stat. 852, 42 USC §4321 *et seq.*
- National Flood Insurance Act of 1968, PL 90-448, 82 Stat. 572, 42 USC §4001 *et seq.*
- National Park System Final Procedures for Implementing E.O. 11988 and 11990, 45 *Federal Register* (FR) 35916 as revised by 47 FR 36718)
- Protection and Enhancement of Environmental Quality, E.O. 11514 as amended, 1970, E.O. 11991, 35 FR 4247; 1977, 42 FR 26967)
- Resource Conservation and Recovery Act, PL 94-580, 30 Stat. 1148, 42 USC §6901 *et seq.*
- Safe Drinking Water Act, PL 93-523, 88 Stat. 1660, 42 USC §300f *et seq.*, 42 USC §201 and 21 USC §349
- Soil and Water Resources Conservation Act of 1977

- Water Resources Planning Act of 1965 (PL 89-80, 42 USC § 1962 *et seq.*) and Water Resource Council's Principles and Standards, 44 FR 723977
- Watershed Protection and Flood Prevention Act, PL 92-419, 68 Stat. 666, 16 USC §100186

#### Other

- Administrative Procedures Act, 5 USC § 551-559, §§701-706
- Aircraft Overflights Study Act of 1987, PL 101-91, 101 Stat. 674
- Concessions Policy Act of 1965, PL 89-249, 79 Stat. 969, 16 USC § 20 *et seq.*
- Department of Transportation Act of 1966, PL 89-670, 80 Stat. 931, 49 USC § 303
- Disposal of Materials on Public Lands (Material Act of 1947), 30 USC §§601-604
- Energy Supply and Environmental Coordination Act of 1974
- Executive Order 11987: Exotic Organisms, 42 FR 26407
- Executive Order 11989 (42 FR 26959) and 11644: Offroad Vehicles on Public Lands
- Executive Order 12003: Energy Policy and Conservation, 3 CFR 134 (Supp. 1977), 42 USC § 2601
- Executive Order 12008: Federal Compliance with Pollution Control Standards
- Executive Order 12372: Intergovernmental Review of Federal Programs, 47 FR 30959
- Federal Coal Leasing Amendments Act of 1976, PL 94-377, 90 Stat. 1083, 30 USC §201
- Federal Land Policy and Management Act, PL 94-579, 90 Stat. 199, 43 USC §1714 *et seq.*
- Federal Power Act of 1920, PL Chapter 285, 41 Stat. 106, 16 USC §791a *et seq.*
- Federal Water Power Act, PL Chapter 285, 41 D 1063, 16 USC §823a, as amended 16 USC §797
- Federal Water Project Recreation Act, 79 Stat. 213, PL 89-72, 16 USC §§ 460l-12 to 460l-21
- Forest and Rangeland Renewable Resources Planning Act, PL 95-307, 92 Stat. 353, 16 USC §1600 *et seq.*
- Freedom of Information Act, PL 93-502, 5 USC §552 *et seq.*
- Intergovernmental Cooperation Act of 1968, PL 90-577, 40 USC §§ 531-535 and 31 USC §§6501-6508
- Intergovernmental Coordination Act of 1969, 42 USC §§4101, 4231, 4233
- Land and Water Conservation Fund Act of 1965 as amended, PL 88-578, 78 Stat. 897, 16 USC §§460l-4 to 460l-11
- Mineral Leasing Act for Acquired Lands of 1947, PL Chapter 681, 61 Stat. 681, 30 USC §351 *et seq.*
- Mineral Leasing Act of 1920, 30 USC §181 *et seq.*, as amended
- Mineral Materials Disposal Act of 1947, 30 USC §601 *et seq.*
- Mining Law of 1872, 30 USC §22 *et seq.*
- Mining Activity within National Park Service Areas, PL 94-429, 90 Stat. 1342 16 USC §1901 *et seq.*
- National Trails System Act, PL 90-543, 82 Stat. 919, 16 USC §§1241-1251
- Noise Control Act of 1972 as amended, PL 92-574, 42 USC §4901 *et seq.*
- Outdoor Recreation Coordination Act of 1963, PL 88-29, 77 Stat. 49
- Payment in Lieu of Taxes Act, PL 94-565, 90 Stat. 2662, 31 USC §6901 *et seq.*
- Policies on Construction of Family Housing for Government Personnel, OMB A-18
- Revised Statute 2477, Right-of-way across Public Lands, Act of July 26, 1866, 43 USC §932 (1976), repealed by FLPMA §706(a) October 21, 1976
- Surface Mining Control and Reclamation Act, PL 95-87, 91 Stat. 445, 30 USC § 1201 *et seq.*
- Surface Resources Use Act of 1955, 30 USC §601 *et seq.*

APPENDIXES, PREPARERS AND CONSULTANTS,  
REFERENCES, AND INDEX

- Wilderness Act, PL 88-577, 78 Stat. 890, 16 USC §§1131-1136
- Wildfire Disaster Recovery Act, PL 101-286
- Wildfire Suppression Assistance Act, PL 101-11, 42 USC §1856m, 1856p



## APPENDIX C: SERVICEWIDE MANDATES AND POLICIES

The alternatives considered in this document incorporate and comply with the provisions of the following mandates and policies. Conditions prescribed by servicewide mandates and policies that are particularly important to this document are summarized below. These mandates and policies illustrate that a general management plan is not needed to decide, for instance, that it is appropriate to protect endangered species, control exotic species, protect archeological sites, provide for wheelchair access, and conserve artifacts. Those and other things are already laws, mandates, or policies.

### GOVERNMENT-TO-GOVERNMENT RELATIONS BETWEEN AMERICAN INDIAN TRIBES AND GUADALUPE MOUNTAINS NATIONAL PARK

GOVERNMENT-TO-GOVERNMENT RELATIONS BETWEEN AMERICAN INDIAN TRIBES AND GUADALUPE MOUNTAINS NATIONAL PARK	
Current laws and policies require that the following conditions be achieved in the park:	
Desired Condition	Source
The National Park Service and tribes culturally affiliated with the park maintain positive, productive, government-to-government relationships. Park managers and staff respect the viewpoints and needs of the tribes, continue to promptly address conflicts that occur, and consider American Indian values in park management and operation.	National Historic Preservation Act, Archeological Resources Protection Act, Native American Graves Protection and Repatriation Act, <i>NPS Management Policies 2006</i>
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to park neighbors and other agencies:	
<ul style="list-style-type: none"><li>• Continue to cooperate with tribes in conducting ethnographic studies to better understand which tribes are culturally affiliated with the park and identify culturally significant resources.</li><li>• Continue regular consultations with affiliated tribes to continue to improve communications and resolve any problems or misunderstandings.</li><li>• Continue to encourage the employment of American Indians on park staff to improve communications and working relationships, and encourage cultural diversity in the workplace.</li><li>• Consider culturally affiliated tribal values in efforts to improve overall management and park interpretation.</li><li>• Implement a joint monitoring program to monitor plant-gathering sites for potential impacts.</li></ul>	

## RELATIONS WITH PRIVATE AND PUBLIC ORGANIZATIONS, OWNERS OF ADJACENT LAND, AND GOVERNMENTAL AGENCIES

RELATIONS WITH PRIVATE AND PUBLIC ORGANIZATIONS, OWNERS OF ADJACENT LAND, AND GOVERNMENTAL AGENCIES	
Current laws and policies require that the following conditions be achieved in the park:	
Desired Condition	Source
<p>The national park is managed as part of a greater ecological, social, economic, and cultural system.</p> <p>Good relations are maintained with adjacent landowners, surrounding communities, and private and public groups that affect, and are affected by, the park. The park is managed proactively to resolve external issues and concerns and ensure that park values are not compromised.</p> <p>Because the national park is an integral part of a larger regional environment, the National Park Service works cooperatively with others to anticipate, avoid, and resolve potential conflicts, protect national park resources, and address mutual interests in the quality of life for community residents. Regional cooperation involves federal, state, and local agencies, Indian tribes, neighboring landowners, and all other concerned parties.</p>	NPS <i>Management Policies 2006</i>
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to park neighbors and other agencies:	
<ul style="list-style-type: none"> <li>Continue to establish and foster partnerships with public and private organizations to achieve the mission and purposes of the national park. Partnerships will be sought for resource protection, research, education, and visitor enjoyment.</li> <li>NPS staff will keep landowners, land managers, local governments, and the general public informed about national park management activities. Periodic consultations will occur with landowners and communities affected by national park visitors and management actions. The National Park Service will work closely with local, state, and federal agencies and tribal governments whose programs affect or are affected by activities in the national park. NPS staff will continue their regular consultations with such entities as the Texas state historic preservation office, the Texas Commission on Environmental Quality, American Indian tribes, Culberson and Hudspeth counties in Texas and Eddy and Otero Counties in New Mexico, the Rio Grande Council of Governments, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management, the cities of Van Horn and Dell City in Texas and Carlsbad in New Mexico, the Culberson and Hudspeth County Sheriff's Departments, the Texas Department of Public Safety, and the Texas Department of Transportation, <u>the Texas Forest Service, and the Texas Parks and Wildlife Department.</u></li> <li>Frequent consultations will continue to take place with property owners.</li> <li>Continue to establish and foster partnerships with public and private organizations to achieve the purposes and mission of the park. Partnerships will be sought for resource protection, research, education, and visitor enjoyment purposes.</li> <li>To foster a spirit of cooperation with neighbors and encourage compatible adjacent land uses, park staff will keep landowners, land managers, local governments, and the public informed about park management activities. Periodic consultations will occur with landowners and communities who are affected by, or potentially affected by park visitors and management actions. Park staff will respond promptly to conflicts that arise over their activities, visitor access, and proposed activities and developments on adjacent lands that may affect the park. Park managers will seek agreements with landowners to encourage their lands to be managed in a manner compatible with park purposes. Park staff also will seek ways to provide landowners with technical and management assistance to address issues of mutual interest.</li> <li>Work closely with local, state, and federal agencies and tribal governments whose programs affect, or are affected by, activities in the park. Park managers also will pursue cooperative regional planning whenever possible to integrate the park into issues of regional concern.</li> </ul>	

## NATURAL RESOURCE MANAGEMENT REQUIREMENTS

AIR QUALITY	
The park is a class I air quality area. Current laws and policies require that the following conditions be achieved in the park.	
Desired Condition	Source
<p>Air quality in the park meets national ambient air quality standards for specified pollutants. The park's air quality is maintained or enhanced with no significant deterioration.</p> <p>Nearly unimpaired views of the landscape both within and outside the park are present. Scenic views are substantially unimpaired.</p>	Clean Air Act, NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to air quality.	
<p>Although the National Park Service has very little direct control over air quality in the air shed encompassing the park, park managers will continue to cooperate with the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency to monitor air quality and ensure that air quality is not impaired.</p> <ul style="list-style-type: none"> <li>• Inventory the air quality-related values associated with the park.</li> <li>• Monitor and document the condition of air quality and related values.</li> <li>• Evaluate air pollution impacts and identify causes.</li> <li>• Minimize air quality pollution emissions associated with park operations, including the use of prescribed fire and visitor use activities.</li> <li>• Conduct air quality monitoring in conjunction with other government agencies.</li> <li>• Conduct national park operations in compliance with federal, state, and local air quality regulations.</li> <li>• Ensure healthful indoor air quality at NPS facilities.</li> <li>• Participate in federal, regional, and local air pollution control plans and drafting of regulations and review permit applications for major new air pollution sources</li> <li>• Maintain constant dialogue with the Texas Commission on Environmental Quality regarding visibility conditions at the park.</li> <li>• Participate with the NPS-WASO Air Resources Division on the regional planning group that includes Texas Commission on Environmental Quality that was formed to address regional haze issues in the central United States.</li> <li>• Reduce emissions associated with administrative and recreational uses.</li> <li>• Develop educational programs to inform visitors and regional residents about the threats of air pollution.</li> <li>• Form regional partnerships to develop alternative transportation systems and promote clean fuels.</li> <li>• Participate in research on air quality and effects of air pollution. Determine changes in ecosystem function caused by atmospheric deposition and assess the resistance and resilience of native ecosystems in the face of these external perturbations.</li> <li>• Research effects of atmospheric deposition on plants, soils, and wetlands in the park.</li> </ul>	

<b>BACKCOUNTRY</b>	
The National Park Service will manage backcountry areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment.	
<b>Desired Condition</b>	<b>Source</b>
Backcountry use is managed in accordance with a backcountry management plan (or other plan addressing backcountry uses) that is designed to avoid unacceptable impacts on park resources or adverse effects on visitor enjoyment of appropriate recreational experiences. The Park Service seeks to identify acceptable limits of impacts, monitors backcountry use levels and resource conditions, and takes prompt corrective action when unacceptable impacts occur.	NPS <i>Management Policies 2006</i>
<b>Actions</b>	
The National Park Service will take the following kinds of actions to comply with the policies mentioned above.	
<ul style="list-style-type: none"> <li>• The park's backcountry management plan will be updated to avoid unacceptable impacts on park resources or adverse effects on visitor enjoyment of appropriate recreational experiences.</li> </ul>	

<b>ECOSYSTEM MANAGEMENT</b>	
Current laws and policies require that the conditions delineated below be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The park is managed holistically, as part of a greater ecological, social, economic, and cultural system.	NPS <i>Management Policies 2006</i> (1.5, 4, 4.1, 4.14, 4.41)
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to ecosystem management:	
<ul style="list-style-type: none"> <li>• Continue to seek cooperative agreements with the U.S. Forest Service, and other adjacent land managing agencies to protect ecosystem habitat and wildlife corridors.</li> <li>• Continue to develop cooperative agreements, partnerships, and other feasible arrangements to set an example in resource conservation and innovation, and to facilitate research related to park resources and their management.</li> <li>• Work collaboratively with the landowners inside and outside the park to protect viewsheds leading into and in the park and seen from inside the park. Use cooperative agreements, conservation easements, donation, land exchanges, cooperatively produced management plans, or other tools to accomplish the protection of the views.</li> </ul>	

<b>EXOTIC SPECIES</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The management of populations of exotic plant and animal species, up to and including eradication, are undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.	NPS <i>Management Policies 2006</i> ; EO 13112, "Invasive Species"; NPS-77, "Natural Resources Management Guidelines"
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to exotic species.	
<ul style="list-style-type: none"> <li>• Complete an inventory of plants and animals in the park and regularly monitor the distribution and condition (e.g., health, disease) of selected species that are (a) invasive exotics, (b) native species capable of creating resource problems (e.g., habitat decline due to overpopulation).</li> <li>• Develop a long-term program for reversing the destructive effects of exotic species.</li> <li>• Study the environmental and ecological effects of exotic species invasion to assess threats and prioritize management actions.</li> <li>• Develop methods to restore native grasslands and stabilize eroding areas.</li> <li>• Undertake research to assess the methods by which exotic species become established and spread into native plant communities so that strategies for preventing introduction and establishment can be developed and implemented.</li> <li>• Manage exclusively for native plant species in everything but the developed management zone. In other management zones, limit planting of nonnative species to noninvasive plants that are justified by the historic scene or operational needs.</li> <li>• Control or eliminate exotic plants and animals, exotic diseases, and pest species where there is a reasonable expectation of success and sustainability. Base control efforts on: <ul style="list-style-type: none"> <li>• the potential threat to legally protected or uncommon native species and habitats</li> <li>• the potential threat to visitor health or safety</li> <li>• the potential threat to scenic and aesthetic quality</li> <li>• the potential threat to common native species and habitat</li> </ul> </li> <li>• Manage exotic diseases and pest species based on similar priorities.</li> <li>• Provide interpretive and educational programs on the preservation of native species for visitors and for residents neighboring the park.</li> </ul>	

<b>FIRE MANAGEMENT</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
<p>Park fire management programs are designed to meet resource management objectives prescribed for the various areas of the park and to ensure that the safety of firefighters and the public are not compromised.</p> <p>All wildland fires are effectively managed, considering resource values to be protected and firefighter and public safety, using the full range of strategic and tactical operations as described in an approved fire management plan. Prescribed fires are those fires ignited by managers to achieve resource objectives.</p>	<p>NPS <i>Management Policies 2006</i>; DO 41, "Wilderness Preservation and Management"; DO-18 and RM-18, "Fire Management Guidelines"</p>
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to management of fire:	
<ul style="list-style-type: none"> <li>• Maintain a current fire management plan to reflect changes in wildland fire policy, fire use applications, and the body of knowledge on fire effects within the park's vegetation types.</li> <li>• Maintain a cooperative agreement for fire suppression with appropriate federal, tribal, state, and local agencies and organizations.</li> <li>• Provide information on whether specified objectives for prescribed fires are met. Monitoring programs are instituted for such fires to record fire behavior, smoke behavior, fire decisions, and fire effects.</li> <li>• Conduct research and monitor the effects of fire to ensure that resource objectives are met.</li> <li>• Use fire as a management tool to maintain native plant communities and control exotic species.</li> <li>• Provide visitors information so that they can learn the role of fire in the ecosystem.</li> </ul>	

<b>FLOODPLAINS</b>	
Current laws and policies require that the conditions delineated below be achieved in the park:	
Desired Condition	Source
Natural floodplain values are preserved or restored.	EO 11988 "Floodplain Management"; Rivers and Harbors Act; NPS <i>Management Policies 2006</i> ; Special Directive 93-4 "Floodplain Management, Revised Guidelines for National Park Service Floodplain Compliance" (1993);
Long-term and short-term environmental effects associated with the occupancy and modification of floodplains are avoided.	DO 77-2, "Floodplain Management"; National Flood Insurance Program (44 CFR 60); Special Directive 93-4 "Floodplain Management, Revised Guidelines for National Park Service Floodplain Compliance" (1993)
<p>When it is not practicable to locate or relocate development or inappropriate human activities to a site outside the floodplain or where the floodplain will be affected, the National Park Service</p> <ul style="list-style-type: none"> <li>• Prepares and approves a statement of findings in accordance with DO 77-2.</li> <li>• Uses nonstructural measures as much as practicable to reduce hazards to human life and property while minimizing impacts on the natural resources of floodplains.</li> <li>• Ensures that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR 60).</li> </ul>	NPS <i>Management Policies 2006</i> , Special Directive 93-4 "Floodplain Management, Revised Guidelines for National Park Service Floodplain Compliance" (1993)
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to floodplains:	
<ul style="list-style-type: none"> <li>• Prepare a quantitative analysis of flood depth to allow park staff to develop appropriate mitigation measures for the flash flood prone areas.</li> <li>• Establish a flood awareness, preparedness and warning system to evacuate the most flood- and erosion-prone structures and campgrounds at times of imminent danger.</li> <li>• Visitors including those hiking, parking and picnicking in or near small channels would be made aware of hazards associated with flash flooding and informed of what to do when water is flowing in low-water road crossings.</li> </ul>	

<b>GENERAL NATURAL RESOURCES / RESTORATION</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
Native species populations that have been severely reduced in or extirpated from the park are restored where feasible and sustainable.	NPS <i>Management Policies</i> 2006; NPS-77, "Natural Resources Management Guidelines"
Populations of native plant and animal species function in as natural condition as possible except where special considerations are warranted.	
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to protection and restoration of native species.	
<ul style="list-style-type: none"> <li>• Complete an inventory of plants and animals in the park and regularly monitor the distribution and condition (e.g., health, disease) of selected species that are indicators of ecosystem condition and diversity.</li> <li>• Develop methods to restore native biological communities.</li> <li>• Research soil properties including nutrients, microorganisms and soil crusts to learn how to restore native plant communities.</li> <li>• Determine source of soil nutrients and the effects of atmospheric pollution on soils and soil biological crusts.</li> <li>• Monitor mountain lion and bear populations for distribution and condition.</li> <li>• Determine genetic integrity and viability of the mountain lion population through DNA analysis.</li> <li>• <u>Restore lands previously disturbed by human impact.</u></li> <li>• <u>Prepare and update an integrated pest management plan to effectively manage pests and determine best practices.</u></li> </ul>	



<b>GEOLOGIC RESOURCES</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The park's geologic resources are preserved and protected as integral components of the park's natural systems.	NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
The Park Service manages caves and karst in accordance with approved cave management plans to perpetuate the natural systems associated with the caves and karst.	NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to geologic resources:	
<ul style="list-style-type: none"> <li>Assess the impacts of natural processes and human-related events on geologic resources.</li> <li>Maintain and restore the integrity of existing geologic resources.</li> <li>Integrate geologic resource management into NPS operations and planning.</li> <li>Interpret geologic resources for visitors.</li> <li>Manage caves in accordance with approved cave management plan to perpetuate the natural systems associated with the caves; update plan. Prepare a cave survey, including maps, locations, and assessments of park caves, using NPS protocols.</li> <li>Partner with the U.S. Geological Survey and others to identify, address, and monitor geologic hazards.</li> <li>Develop programs to educate visitors about geologic resources.</li> <li>Collect baseline information on surficial geology.</li> <li>Develop a plan to address geologic research, inventory, and monitoring.</li> <li>Update geologic map of the park in digital format that can be used in the park's geographic information system (GIS).</li> <li>Update geologic history of the park, using modern theory and techniques.</li> <li>Update geologic interpretations of localities that are the subject of interpretive stops or displays.</li> <li>Prepare a geologic inventory, including the identification of the significant geologic processes that shape park ecosystems and the identification of the human influences on those geologic processes (i.e., "geoindicators"); identification of geologic hazards; inventory of type sections or type localities within the park; inventory of "textbook" localities that provide particularly good or well-exposed examples of geologic features or events, and that may warrant special protection or interpretive efforts; and, identification of interpretive themes or other opportunities for interpreting the significant geologic events or processes that are preserved, exposed, or occur in the park.</li> <li>Manage park geologic features in situ to the extent possible to protect specific features and maintain them in excellent condition.</li> </ul>	

<b>LAND PROTECTION</b>	
The National Park Service will manage for protection of park lands.	
<b>Desired Condition</b>	<b>Source</b>
Land protection plans are prepared to determine and publicly document what lands or interests in land need to be in public ownership, and what means of protection are available to achieve the purposes for which the national park system unit was created.	NPS <i>Management Policies 2006</i>
<b>Actions</b>	
The National Park Service will take the following kinds of actions to comply with the policies mentioned above.	
<ul style="list-style-type: none"> <li>Prepare a land protection plan for the park.</li> </ul>	

<b>LIGHTSCAPE MANAGEMENT / NIGHT SKY</b>	
The park's night sky is a feature that contributes to visitors' experiences. Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
Excellent opportunities to see the night sky are available. Artificial light sources both within and outside the park do not unacceptably adversely affect opportunities to see the night sky.	<i>NPS Management Policies 2006</i>
<b>Actions</b>	
The National Park Service will take the following kinds of actions to comply with the policy mentioned above:	
<ul style="list-style-type: none"> <li>• The National Park Service will cooperate with park visitors, neighbors, and local government agencies to find ways to prevent or minimize the intrusion of artificial light into the night scene in the park.</li> <li>• In natural areas, artificial outdoor lighting will be limited to basic safety requirements and will be shielded when possible.</li> <li>• The park staff will evaluate the impacts on the night sky caused by park facilities. If light sources in the park are affecting night skies, the staff will study alternatives such as shielding lights, changing lamp types, or eliminating unnecessary sources.</li> <li>• Park staff will work with Culberson and Hudspeth Counties to reduce or eliminate the impacts of artificial outdoor lighting.</li> </ul>	

<b>NATIVE VEGETATION AND ANIMALS</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The National Park Service will maintain as parts of the natural ecosystem, all native plants and animals in the park.	<i>NPS Management Policies 2006; NPS-77 "Natural Resources Management Guideline"</i>
	<i>NPS Management Policies 2006; NPS-77, "Natural Resources Management Guidelines"</i>
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to native wildlife and vegetation:	
<ul style="list-style-type: none"> <li>• Complete inventory of the plants and animals in the park and regularly monitor the distribution and condition of selected species that are indicators of ecosystem condition and diversity.</li> <li>• Develop methods to restore native biological communities.</li> <li>• Minimize human impacts on native plants, animals, populations, communities and ecosystems and the processes that sustain them.</li> <li>• Restore native plant and animal populations in the park that have been extirpated by past human-caused action, where feasible.</li> <li>• Whenever possible, natural processes will be relied upon to maintain native plant and animal species, and to influence natural fluctuations in populations of these species.</li> <li>• Protect a full range of genetic types (genotypes) of native plant and animal populations in the park by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity.</li> <li>• Complete a vegetation map for the park.</li> <li>• Map critical habitat for selected species.</li> </ul>	

<b>NATURAL SOUNDSCAPES</b>	
An important part of the NPS mission is to preserve or restore the natural soundscapes associated with national park system units. The sounds of nature are among the intrinsic elements that combine to form the environment of our national park system units. Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The National Park Service preserves the natural ambient soundscapes, restores degraded soundscapes to the natural ambient condition wherever possible, and protects natural soundscapes from degradation due to human-caused noise. Disruptions from recreational uses are managed to provide a high-quality visitor experience in an effort to preserve or restore the natural quiet and natural sounds.	NPS <i>Management Policies 2006</i> , DO 47, "Sound Preservation and Noise Management"
Noise sources are managed to preserve or restore the natural soundscape.	Executive memorandum signed by President Clinton on April 22, 1996
<b>Actions</b>	
The National Park Service will take the following kinds of actions to comply with the policies mentioned above.	
<ul style="list-style-type: none"> <li>• Actions will be taken to monitor and minimize or prevent or minimize unnatural sounds that adversely affect park resources or values or visitors' enjoyment of them.</li> <li>• The park staff continues to require tour bus companies to comply with regulations designed to reduce noise levels (e.g., turning off engines when buses are parked).</li> <li>• Noise generated by NPS management activities will be minimized by strictly regulating administrative functions such as the use of motorized equipment. Noise will be a consideration in the procurement and use of equipment by the park staff.</li> <li>• Work with the Department of Defense to address problems from military flights.</li> <li>• Encourage visitors to avoid unnecessary noise, such as through the use of generators and maintaining quiet hours in the campgrounds.</li> </ul>	

<b>PALEONTOLOGICAL RESOURCES</b>	
<b>Desired Condition</b>	<b>Source</b>
Paleontological resources, including both organic and mineralized remains in body or trace form, are protected, preserved, and managed for public education, interpretation, and scientific research.	NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to paleontological resources:	
<ul style="list-style-type: none"> <li>• Establish programs to inventory paleontological resources and systematically monitor for newly exposed fossils, especially in areas of rapid erosion.</li> <li>• Undertake a paleontological inventory and survey, including information on paleontological research that has already been performed in the park, lists of fossil species found in the park, maps of high probability areas expected to produce fossils, recommendations for future research, identification of threats to fossil resources, and strategies for their protection.</li> <li>• Prepare a paleontology site layer for the park's GIS (i.e., database of fossil localities that have been excavated or are known to contain fossils).</li> <li>• Partner with federal, state, and local agencies and with academic institutions to conduct paleontological research.</li> <li>• Manage fossils collected in accordance with the park's collection management plan.</li> <li>• Manage paleontological resources and study them in their geologic context, which provides information about the ancient environment.</li> <li>• Manage the park's paleontological resources to preserve them in situ and as appropriate in collections and to preserve them in excellent condition.</li> </ul>	

<b>SOILS</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The National Park Service actively seeks to understand and preserve the soil resources of the park, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.	NPS <i>Management Policies 2006</i> ; NPS-77 "Natural Resources Management Guideline"
Natural soil resources and processes function in as natural a condition as possible, except where special considerations are allowable under policy.	NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to soils:	
<ul style="list-style-type: none"> <li>• Update soils map of the park in digital format that can be used in the park's geographic information system (GIS).</li> <li>• Whenever possible, park staff would educate visitors about soils.</li> <li>• Collect baseline information on soils.</li> <li>• Take actions to prevent — or if that is not possible, to minimize — adverse, potentially irreversible impacts on soils. Possibly implement soil conservation and soil amendment practices to reduce impacts, and import off-site soil or use soil amendments to restore damaged sites. Off-site soil normally is salvaged soil, not soil removed from pristine sites, unless the use of pristine site soil can be achieved without causing any unacceptable adverse impacts on the overall ecosystem.</li> <li>• When use of a soil fertilizer or other soil amendment is an unavoidable part of restoring a natural landscape or maintaining an altered plant community, use is guided by a written prescription. The prescription ensures that such use of soil fertilizer or soil amendment does not unacceptably alter the physical, chemical, or biological characteristics of the soil, biological community, surface water, or groundwater.</li> <li>• Minimize soil excavation, erosion, and off-site soil migration during and after any ground-disturbing activity.</li> <li>• Survey areas of the park with soil resource problems and take actions appropriate to the management zone to prevent or minimize further erosion, compaction, or deposition.</li> <li>• Apply effective best management practices to problem soil erosion and compaction areas in a manner that stops or minimizes erosion, restores soil productivity, and reestablishes or sustains a self-perpetuating vegetative cover.</li> </ul>	

<b>THREATENED AND ENDANGERED SPECIES</b>	
Current laws and policies require that the following conditions be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
Federally listed and state-listed threatened and endangered species and their habitats are protected and sustained.	Endangered Species Act; equivalent state protective legislation; NPS <i>Management Policies 2006</i> ; NPS-77, "Natural Resources Management Guidelines"
Native threatened and endangered species populations that have been severely reduced in or extirpated from the park are restored where feasible and sustainable.	
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to species of special concern:	
<ul style="list-style-type: none"> <li>• Support research that contributes to management knowledge of rare and protected species and their habitat.</li> <li>• To protect rare or protected species and their habitat, complete an inventory of rare or protected plants and animals in the park and regularly monitor the distribution and condition (e.g., health, disease). Modify management plans to be more effective based on the results of monitoring.</li> <li>• Cooperate with the U.S. Fish and Wildlife Service, as appropriate, to ensure that NPS actions comply with the Endangered Species Act.</li> <li>• Survey for, protect, and strive to recover all species native to the park that are listed under the Endangered Species Act.</li> <li>• Participate in the recovery planning process when appropriate.</li> <li>• Manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for listed species.</li> <li>• To the greatest extent possible, inventory, monitor, and manage state and locally listed species in a manner similar to federally listed species.</li> </ul>	

<b>WATER RESOURCES</b>	
Current laws and policies require that the conditions delineated below be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
Surface water and groundwater are protected and water quality meets or exceeds all applicable water quality standards.	Safe Drinking Water Act; Clean Water Act; Executive Order (EO) 11514 "Protection and Enhancement of Environmental Quality"; NPS <i>Management Policies 2006</i> ; DO—77 and RM-77, RM-83 "Drinking Water; DO-83 "Public Health"; "Natural Resources Management Guidelines"
NPS and NPS-permitted programs and facilities are maintained and operated to avoid pollution of surface water and groundwater.	Clean Water Act; EO 12088, "Federal Compliance with Pollution Control Standards"; Rivers and Harbors Act; NPS <i>Management Policies 2006</i> ; DO—77 and RM-77, "Natural Resources Management Guidelines"
<b>Actions</b>	
The NPS will take the following kinds of actions to meet legal and policy requirements related to water resources:	
<ul style="list-style-type: none"> <li>• Work with appropriate governmental bodies to obtain the highest possible water quality standards available under the Clean Water Act.</li> <li>• Cooperate with other government agencies to maintain and/or restore quality of park water resources.</li> <li>• Take all necessary actions to maintain or restore the quality of surface water and groundwater in the park consistent with the Clean Water Act.</li> <li>• Determine which methods can be used to ensure minimum flows under state and federal law.</li> <li>• Investigate and monitor water quality including salinity and trace elements. Study the effects of the water quality on aquatic life.</li> <li>• Determine minimum flow needs to sustain aquatic life.</li> <li>• Promote water conservation by the National Park Service, concessioners, visitors, and park neighbors.</li> <li>• Apply best management practices to all pollution-generating activities and facilities in the park, such as NPS maintenance and storage facilities and parking areas.</li> <li>• Minimize the use of pesticides, fertilizers, and other chemicals and manage them in keeping with NPS policy and federal regulations.</li> <li>• Continue to monitor water flows and quality at selected springs and seeps and in McKittrick Canyon.</li> <li>• Work with regional water planning entities and with underground water conservation districts to manage groundwater.</li> <li>• Develop a groundwater monitoring strategy and monitor selected wells to determine the effects of water mining from adjacent areas on the park's groundwater and aquifers.</li> <li>• Work with other entities to determine the impact of NPS activities on local aquifers.</li> <li>• Press for continued and expanded monitoring to fulfill the database requirement and thus reveal any unknown water quality problems.</li> <li>• Develop and implement a water resources management plan for the park.</li> <li>• Develop a monitoring plan to monitor the effects of visitor use on water resources, especially in McKittrick Canyon and at selected springs.</li> <li>• Continue to assess stormwater runoff.</li> <li>• Promote greater public understanding of water resource issues at the park and encourage public support for and participation in protecting the park's groundwater and the McKittrick Canyon watershed.</li> <li>• Conduct or obtain inventories for all water and riparian resources to ensure proper planning, management, and protection.</li> <li>• Conduct condition assessments and determine desired future conditions.</li> </ul>	

<b>WETLANDS</b>	
Current laws and policies require that the conditions delineated below be achieved in the park:	
<b>Desired Condition</b>	<b>Source</b>
The natural and beneficial values of wetlands are preserved and enhanced.	Clean Water Act; EO 11990; "Protection of Wetlands"; NPS <i>Management Policies 2006</i> ; DO 77-1, "Wetland Protection"; Rivers and Harbors Act;
The National Park Service implements a "no net loss of wetlands" policy and strives to achieve a longer-term goal of net gain of wetlands across the national park system through the restoration of previously degraded wetlands.	DO 77-1, "Wetland Protection"; EO 11514 "Protection and Enhancement of Environmental Quality"
The National Park Service avoids to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and avoids direct or indirect support of new construction in wetlands wherever there is a practicable alternative.	EO 11990; "Protection of Wetlands"
The National Park Service compensates for remaining unavoidable adverse impacts on wetlands by restoring wetlands that have been previously degraded.	"Protecting America's Wetlands: A Fair, Flexible, and Effective Approach," White House Office on Environmental Policy, 1993; NPS 77-1, "Wetland Protection"
<b>Actions</b>	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to wetland resources:	
<ul style="list-style-type: none"> <li>• Develop and implement a water resources management plan for the park.</li> <li>• Locate all facilities to avoid wetlands if feasible. If avoiding wetlands was not feasible, other actions would be taken to comply with Executive Order 11990 ("Protection of Wetlands"), the Clean Water Act, and Director's Order 77-1 ("Wetland Protection").</li> <li>• Prepare a statement of findings for wetlands if the NPS actions would result in adverse impacts on wetlands. The statement of findings would include an analysis of the alternatives, delineation of the wetland, a wetland restoration plan to identify mitigation, and a wetland functional analysis of the impact site and restoration site.</li> <li>• Conduct or obtain parkwide wetland inventories to ensure proper planning, management, and protection of wetlands.</li> <li>• <u>Conduct condition assessments and determine desired future conditions.</u></li> <li>• Enhance natural wetland values by using them for educational and scientific purposes that do not disrupt natural wetland functions.</li> <li>• If natural wetland functions have been degraded or lost due to human action, work to restore wetlands to predisturbance conditions, to the extent practicable.</li> </ul>	

WILDERNESS	
The National Park Service will manage wilderness areas including those proposed for wilderness designation for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness.	
Desired Condition	Source
The park ensures that wilderness characteristics and values are retained and protected, that visitors continue to find opportunities for solitude and primitive, unconfined recreation, and that signs of people remain substantially unnoticeable.	NPS <i>Management Policies 2006</i> ; DO 41 "Wilderness Preservation and Management," Wilderness Act of 1964
Actions	
The National Park Service will take the following kinds of actions to comply with the policies mentioned above.	
<ul style="list-style-type: none"> <li>• New lands were added to the park, so a wilderness eligibility assessment was prepared by the park staff.</li> <li>• Areas proposed/recommended for wilderness will continue to be managed so as to not diminish their wilderness characteristics until Congress has taken action on the proposal/recommendation.</li> <li>• Uses that are in keeping with the definitions and purpose of wilderness, and do not degrade wilderness resources and character, will be encouraged. Appropriate restrictions may be imposed on any authorized activity to preserve wilderness character and resources, or to ensure public safety.</li> <li>• The park staff will develop and maintain a wilderness management plan or equivalent planning document to guide the preservation, management, and use of these resources.</li> <li>• Managers considering the use of aircraft or other motorized equipment or mechanical transportation in wilderness must consider impacts to the character, aesthetics, and traditions of wilderness before considering the costs and efficiency of the equipment.</li> <li>• All management decisions affecting wilderness must be consistent with the minimum requirement concept: a proposed management action must be appropriate or necessary for administration of the area as wilderness and not pose a significant impact on wilderness resources and character, and the management method (tools) used must cause the least amount of impact on the wilderness resources and character. Administrative use of motorized equipment or mechanical transport will be authorized only if the superintendent determines it is the minimum requirement needed to achieve the purposes of the area as wilderness, or it is needed in an emergency situation involving the health or safety of persons actually within the area.</li> <li>• In evaluating environmental impacts, the National Park Service will take into account wilderness characteristics and values, including the primeval character and influence of the wilderness; the preservation of natural conditions (including the lack of man-made noise); and assurances that there will be outstanding opportunities for solitude, that the public will be provided with a primitive and unconfined type of recreational experience, and that wilderness will be preserved and used in an unimpaired condition. Managers will be expected to appropriately address cultural resources management considerations in the development and review of environmental compliance documents for actions that might impact wilderness resources.</li> <li>• Scientific activities will be encouraged and permitted when consistent with NPS responsibilities to preserve and manage wilderness.</li> <li>• Wilderness education/interpretive programs will be used to inform visitors about wilderness ethics and how to minimize their impacts on wilderness. Leave-no-trace practices will be emphasized.</li> </ul>	



## CULTURAL RESOURCE MANAGEMENT REQUIREMENTS

ARCHEOLOGICAL RESOURCES	
Current laws and policies require that the following conditions be achieved in the park:	
Desired Condition	Source
Archeological sites are identified and inventoried and their eligibility for the National Register of Historic Places determined and documented. Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. When disturbance or deterioration is unavoidable, the site is mitigated and professionally documented and excavated for data recovery and the resulting artifacts, materials, and records are curated and conserved in the park's museum collections and archives. Concurrence for mitigation is in consultation with the Texas state historic preservation officer (and American Indian tribes if applicable). Some archeological sites that can be adequately protected may be interpreted to the visitor.	National Historic Preservation Act of 1966; Archeological Resources Protection Act of 1979; the <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> ; programmatic memorandum of agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS <i>Management Policies 2006</i> , DO 28 "Cultural Resource Management Guideline"
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to archeological sites:	
<ul style="list-style-type: none"> <li>• Survey and inventory archeological sites park wide, determine and document their eligibility for inclusion in the National Register of Historic Places. The most critical area for study is park land where development or visitor activity is planned.</li> <li>• Determine which archeological sites should be entered in the Archeological Sites Management Information System (ASMIS) and which should be nominated for the National Register of Historic Places as eligible for listing.</li> <li>• Continue to educate visitors on laws and regulations governing archeological resources and their prohibited removal and transport from the park.</li> <li>• Continue to monitor archeological sites.</li> <li>• Treat all archeological resources as eligible for listing in the National Register of Historic Places pending a formal determination of eligibility suggested by the National Park Service and concurred with by the state historic preservation officer, in consultation with American Indian tribes if traditionally associated with the resource.</li> <li>• Protect all archeological resources eligible for listing or listed in the national register; if disturbance to such resources is unavoidable, conduct formal consultation with the Texas Historical Commission (state historic preservation officer) and American Indian tribes in accordance with the National Historic Preservation Act and implementing regulations of the Advisory Council on Historic Preservation.</li> </ul>	

HISTORIC STRUCTURES	
Current laws and policies require that the following conditions be achieved for historic structures (e.g., buildings, structures, roads, and trails):	
Desired Condition	Source
Historic structures are inventoried and their integrity and eligibility are evaluated under National Register of Historic Places criteria. The qualities that contribute to the listing or eligibility for listing of historic structures on the national register are protected in accordance with the <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).	National Historic Preservation Act of 1966; Archeological and Historic Preservation Act of 1974; the <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> ; <i>Secretary of the Interior's Standards for the Treatment of Historic Properties</i> ; programmatic memorandum of agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS <i>Management Policies 2006</i> , DO 28 "Cultural Resource Management Guideline."
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to historic structures:	
<ul style="list-style-type: none"> <li>• Update and certify the list of classified structures (LCS), and complete a survey, inventory, and national-register eligibility evaluation of historic structures in concurrence with the state historic preservation officer.</li> <li>• Determine and implement the appropriate level of preservation for each historic structure formally determined to be eligible for listing or listed in the National Register of Historic Places (subject to the <i>Secretary of the Interior's Standards</i>).</li> <li>• Analyze the design elements (e.g., materials, colors, shape, massing, scale, architectural details, and site details) of historic structures in the park (e.g., intersections, curbing, signs, and roads and trails) to guide the rehabilitation and maintenance of sites and structures.</li> <li>• Prepare historic preservation plans to guide maintenance.</li> <li>• Document history through oral histories of individuals, groups, and others who have ties to the park.</li> <li>• Before modifying any historic structure on the National Register of Historic Places, such as the Frijole Ranch or the Wallace Pratt Cabin, the National Park Service will consult with the state historic preservation officer, as appropriate, and the Advisory Council for Historic Preservation. If necessary:</li> <li>• Submit the inventory and evaluation results to the state historic preservation officer for review and comment. Forward the final nomination to the keeper of the national register with recommendations for eligibility to the national register.</li> </ul>	

ETHNOGRAPHIC RESOURCES	
<p>Certain contemporary American Indian and other communities are permitted by law, regulation, or policy to pursue customary religious, subsistence, and other cultural uses of NPS resources with which they are traditionally associated. Recognizing that its resource protection mandate affects this human use and cultural context of park resources, the National Park Service plans and executes programs in ways to safeguard cultural and natural resources while reflecting informed concern for contemporary peoples and cultures traditionally associated with them.</p>	
Desired Condition	Source
Appropriate cultural anthropological research will be conducted in cooperation with groups associated with the park.	National Historic Preservation Act of 1966 as amended; Advisory Council for Historic Preservation implementing regulations; NPS <i>Management Policies 2006</i> , DO 28 "Cultural Resource Management Guideline"
To the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, the National Park Service accommodates access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoids adversely affecting the physical integrity of these sacred sites."	EO 13007 on American Indian Sacred Sites (3 CFR 196 [1997]; American Indian Religious Freedom Act of 1978.
NPS general regulations on access to and use of natural and cultural resources in the national park are applied in an informed and balanced manner that is consistent with national park purposes and does not unreasonably interfere with American Indian use of traditional areas or sacred resources and does not result in the degradation of national park resources.	EO 13007 on American Indian Sacred Sites; NPS <i>Management Policies 2006</i>
American Indians and other individuals and groups linked by ties of kinship or culture to ethnically identifiable human remains, sacred objects, objects of cultural patrimony, and associated funerary objects are consulted when such items may be disturbed or are encountered on park lands.	NPS <i>Management Policies 2006</i> ; Native American Graves Protection and Repatriation Act of 1978
Access to sacred sites and park resources by American Indians continues to be provided when the use is consistent with park purposes and the protection of resources.	
All ethnographic resources determined eligible for listing or listed in the national register are called traditional cultural properties and are protected through tribal consultation. If disturbance of such resources is unavoidable, formal consultation with the state historic preservation officer and the Advisory Council for Historic Preservation, if necessary, and as appropriate with American Indian tribes, is conducted.	
All executive agencies are required to consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments before taking actions that affect federally recognized tribal governments. These consultations are to be open and candid so that all interested parties may evaluate for themselves the potential impact of relevant proposals.	Presidential memorandum of April 29, 1994, on government-to-government relations with tribal governments; National Historic Preservation Act of 1966 as amended; Advisory Council for Historic Preservation implementing regulations
The identities of community consultants and information about sacred and other culturally sensitive places and practices will be kept confidential when research agreements or other circumstances warrant.	National Historic Preservation Act of 1966 as amended; NPS <i>Management Policies 2006</i>

ETHNOGRAPHIC RESOURCES (cont.)
<p style="text-align: center;"><b>Actions</b></p>
<p>To accomplish the above goals, the National Park Service will do the following:</p>
<ul style="list-style-type: none"> <li>• Prepare a cultural affiliation study to determine which tribes should be consulted for actions at the park.</li> <li>• Prepare an ethnographic overview and assessment.</li> <li>• Survey and inventory ethnographic resources and document their eligibility to the National Register of Historic Places as traditional cultural properties.</li> <li>• Treat all ethnographic resources as eligible for listing in the National Register of Historic Places pending a formal determination by the National Park Service and the state historic preservation officer as to their significance.</li> <li>• Conduct regular consultations with American Indian tribes traditionally associated with the park to continue to improve communications and resolve any problems or misunderstandings that occur.</li> <li>• Continue to encourage the employment of American Indians on the park staff to improve communications and working relationships and encourage cultural diversity in the workplace.</li> <li>• Continue to provide access to sacred sites and park resources by American Indians when the traditional use is consistent with park purposes and the protection of resources.</li> <li>• Provide for access to and use of natural and cultural resources in the park and collections by American Indians that are consistent with park purposes; do not reasonably interfere with American Indian use of traditional areas or sacred resources, and do not degrade park resources.</li> <li>• Protect all ethnographic resources determined eligible for listing or listed in the national register; if disturbance to such resources is unavoidable, conduct formal consultation with associated tribes and the state historic preservation officer, and, as appropriate, the Advisory Council on Historic Preservation, in accordance with the National Historic Preservation Act.</li> <li>• Conduct consultation with traditionally associated Indian tribes throughout the course of the planning process for this document.</li> <li>• Have tribes identify resources important to Indian tribes during the scoping process, and carefully incorporate this information into the design of all the alternatives so that these resources are protected under any alternative considered.</li> <li>• Document oral histories with individuals, groups, and tribes linked to the park to establish cultural affiliation and obtain information necessary to better manage park ethnographic resources.</li> </ul>

<b>CULTURAL LANDSCAPES</b>	
<p>According to the National Park Service's <i>Cultural Resource Management Guideline</i> (DO-28), a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.</p> <p>Current laws and policies require that the following conditions be achieved for cultural landscapes.</p>	
<b>Desired Condition</b>	<b>Source</b>
<p>Cultural landscape inventories are conducted to identify landscapes potentially eligible for listing in the National Register of Historic Places, to assist in future management decisions for landscapes and associated resources, both cultural and natural.</p> <p>The management of cultural landscapes focuses on preserving the landscape's physical attributes, biotic systems, and use when that use contributes to its historical significance.</p> <p>The preservation, rehabilitation, restoration, or reconstruction of cultural landscapes is undertaken in accordance with the <i>Secretary of the Interior's Standards for the Treatment of Historic Properties with Guideline's for the Treatment of Cultural Landscapes</i>.</p>	<p>National Historic Preservation Act of 1966, as amended (16 USC 470); Advisory Council on Historic Preservation's implementing regulations regarding the "Protection of Historic Properties" (36 CFR 800); <i>Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes</i> (1996); National Park Service's <i>Management Policies 2006</i>; National Park Service's <i>Cultural Resources Management Guideline</i> (DO-28, 1998)</p>
<b>Actions</b>	
<p>To accomplish the above goals, the National Park Service will do the following:</p>	
<ul style="list-style-type: none"> <li>• Complete a survey, inventory, and national-register eligibility evaluation of cultural landscapes under national register criteria in concurrence with the state historic preservation officer.</li> <li>• Submit the inventory and evaluation results to the state or tribal historic preservation officer for review and comment; forward final nomination form to the keeper of the national register with recommendations for eligibility to the national register.</li> <li>• Determine, implement and maintain the appropriate level of preservation for each landscape formally determined to be eligible for listing or listed on the national register, subject to the <i>Secretary of the Interior's Standards</i>.</li> <li>• Prepare cultural landscape reports for cultural landscapes to determine historical significance, to support preservation needs and guide the rehabilitation and maintenance of cultural landscapes.</li> </ul>	

MUSEUM COLLECTIONS	
Current laws and policies require that the following conditions be achieved in the park for museum collections:	
Desired Condition	Source
<p>All museum collections (objects, artifacts, specimens, and manuscript collections) are identified and inventoried, catalogued, documented, preserved, and protected, and provision is made for access to and use of these items for exhibits, research, training, and interpretation.</p> <p>The qualities that contribute to the significance of collections are protected in accordance with established standards.</p>	<p>National Historic Preservation Act of 1966; Archeological and Historic Preservation Act of 1974; Archeological Resources Protection Act of 1979; Native American Graves Protection and Repatriation Act of 1990; NPS <i>Management Policies 2006</i>, DO 24 "NPS Museums Collection Management," DO 28 "Cultural Resource Management Guideline," NPS Museum Handbook</p>
Actions	
<p>The park's museum collections are properly stored and have adequate security and adequate fire protection conditions. However, space is lacking to expand for curation and research, and to return items on loan to other institutions for proper storage in the park. Notable portions of the archeological and historical collections are not catalogued. To accomplish the above goals, the National Park Service will do the following:</p>	
<ul style="list-style-type: none"> <li>• Inventory and catalog all park museum collections in accordance with standards in the NPS <i>Museum Handbook</i>.</li> <li>• The majority of the museum collections would be stored off-site in approved collection repositories consistent with the servicewide Museum Collections Facilities Strategy. A representative sample of the collection would remain within the park for research, training, and interpretive purposes. Appropriate study and storage space would be incorporated into the new consolidated headquarters and administrative building. The design of these spaces would be consistent with applicable preservation and security standards.</li> </ul>	

## VISITOR USE AND EXPERIENCE AND PARK USE REQUIREMENTS

VISITOR USE AND EXPERIENCE AND PARK USE REQUIREMENTS	
Current laws, regulations, and policies leave considerable room for judgment about the best mix of types and levels of visitor use activities, programs, and facilities. For this reason, most decisions related to visitor experience and use are addressed in the alternatives. However, all visitor use of parks must be consistent with the following guidelines.	
Desired Condition	Source
Park resources are conserved “unimpaired” for the enjoyment of future generations. Visitors have opportunities for types of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the park. No activities occur that would cause derogation of the values and purposes for which the park was established.	NPS Organic Act, National Park System General Authorities Act, NPS <i>Management Policies 2006</i>
For all zones, districts, or other logical management divisions within the park, the types and levels of visitor use are consistent with the desired resource and visitor experience conditions prescribed for those areas.	National Park System General Authorities Act, NPS <i>Management Policies 2006</i>
Park visitors will have opportunities to understand and appreciate the significance of the park and its resources, and to develop a personal stewardship ethic.	NPS <i>Management Policies 2006</i>
To the extent feasible, programs, services, and facilities in the park are accessible to and usable by all people, including those with disabilities.	Americans with Disabilities Act of 1990; 28 CFR 36 and <u>Architectural Barriers Act Accessibility Guidelines</u> ; U.S. Access Board Draft Accessibility Guidelines for Outdoor Developed Areas of 1999; NPS <i>Management Policies 2006</i> ; DO-42, <i>Accessibility for Visitors with Disabilities in NPS Programs, Facilities, and Services</i> ; Rehabilitation Act of 1973; Secretary of the Interior’s regulation 43 CFR 17, <i>Enforcement on the Basis of Disability in Interior Programs</i> ;
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to visitor understanding and use of the national park system unit:	
<ul style="list-style-type: none"> <li>• Park staff will continue to monitor visitor comments on issues such as crowding, encounters with other visitors in the backcountry, encounters with wildlife, trail safety issues, availability of campsites at busy times of the year, and availability of parking.</li> <li>• Conduct periodic visitor surveys to stay informed of changing visitor demographics and desires to better tailor programs to visitor needs and desires.</li> <li>• Pets must be crated, caged, restrained on a leash 6 feet long or less, or otherwise physically confined at all times. Pets are not allowed on park trails. 36 CFR 2.15</li> <li>• Bicycles are prohibited in the national park except on established public roads and parking areas. 36 CFR 4.30</li> <li>• The use of off-road vehicles is prohibited except on public roads and parking areas. 36 CFR 4.10</li> <li>• For all zones, districts, or other logical management divisions in a park, superintendents will identify visitor carrying capacities for managing public use. Superintendents will also identify ways to monitor for, and address, unacceptable impacts on park resources and visitor experiences. 1978 National Parks and Recreation Act (PL 95-625), NPS <i>Management Policies 2006</i></li> </ul>	

<b>COMMERCIAL SERVICES</b>	
<p>Commercial services are another way of providing for the visitor use and experience and park use requirements already described. Commercial operators are “partners” with the National Park Service to provide goods and services to visitors that are necessary and appropriate but not provided by NPS personnel. The Park Service manages commercial service levels and types to achieve the same resource protection and visitor experience conditions required by the NPS Organic Act, General Authorities Act, management policies, and other regulations and policies. In addition, commercial services must comply with the provisions of the NPS Concessions Management Improvement Act of 1998. By law, all commercial activities in parks must be authorized in writing by the superintendent. A commercial activity is defined as any activity for which compensation is exchanged. It includes activities by for-profit and nonprofit operators. Commercial services are more than just concessions. They include concession contracts, commercial use authorizations, leases, cooperative agreements, rights of way, and special use permits. All commercial services must be managed. All commercial services must be necessary and/or appropriate by achieving the resource protection and visitor use goals for the park unit.</p>	
Desired Condition	Source
Same as Visitor Use and Experience and Park Use Requirements	Same as Visitor Use and Experience and Park Use Requirements
All commercial services must be authorized, must be necessary and/or appropriate, and must be economically feasible. Appropriate planning must be done to support commercial services authorization.	NPS Concessions Management Improvement Act of 1998
<b>Actions</b>	
<p>The National Park Service will take the following kinds of actions to meet legal and policy requirements related to commercial services:</p>	
<ul style="list-style-type: none"> <li>• Establish and document that all commercial services in the park unit are necessary and/or appropriate before they are proposed or reauthorized.</li> <li>• Ensure that all necessary and/or appropriate commercial activities in the park unit are authorized in writing by the superintendent.</li> <li>• Stop all unauthorized commercial activities in the park unit.</li> <li>• Use the most appropriate authorization tool (concession contracts, commercial use authorizations, leases, cooperative agreements, rights of way, and special use permits) to manage the commercial services program effectively and efficiently.</li> <li>• Ensure that all commercial activities in the park unit provide high-quality visitor experiences while protecting important natural, cultural, and scenic resources.</li> <li>• Ensure that new or modified concessions are economically feasible and that the operator has a reasonable opportunity to make a profit before they are proposed in a planning document.</li> <li>• Establish levels of commercial use that are consistent with resource protection and visitor experience goals for the park unit and do not unduly interfere with the independent visitor’s ability to participate in the same activity.</li> <li>• Ensure that all commercial services are safe and sustainable.</li> <li>• Authorize only those commercial services that are not or cannot be made available within a reasonable distance outside the park unit.</li> <li>• Prepare a commercial services plan if necessary to describe in detail the actions required to achieve commercial services and related visitor experience goals.</li> </ul>	



PUBLIC HEALTH AND SAFETY	
NPS <i>Management Policies 2006</i> states that the saving of human life will take precedence over all other management actions as the Park Service strives to protect human life and provide for injury-free visits. Current laws and policies require that the following conditions be achieved in the park:	
Desired Condition	Source
<p>While recognizing that there are limitations on its capability and constraints imposed by the Organic Act to not impair resources, the service and its concessioners, contractors and cooperators will seek to provide a safe and healthful environment for visitors and employees.</p> <p>The park staff will strive to identify recognizable threats to safety and health and protect property by applying nationally accepted standards. Consistent with mandates and nonimpairment, the park staff will reduce or remove known hazards and/or apply appropriate mitigation measures, such as closures, guarding, gating, education, and other actions.</p>	<p>NPS <i>Management Policies 2006</i>, DO-50 and RM-50 "Safety and Health"; DO-58 and RM-58 "Structural Fire Management"; DO-83 and RM-83 "Public Health"; DO-51 and RM-51 "Emergency Medical Services"; DO-30 and RM-30 "Hazard and Solid Waste Management;" OSHA 29 CFR.</p>
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to public health and safety:	
<ul style="list-style-type: none"> <li>• Establish a documented Safety Program in the park to address health and safety concerns and identify appropriate levels of action and activities.</li> <li>• Ensure that all potable water systems and waste water systems in the park meet state and federal requirements.</li> <li>• Provide for interpretive signs and materials to notify visitors of potential safety concerns, hazards and procedures to help provide for a safe visit to the park and to ensure that visitors are aware of possible risks of certain activities.</li> <li>• Establish a Structural Fire Program and maintain a structural fire brigade to provide prevention programs and protection of life and property.</li> <li>• Develop an emergency preparedness program to maximize visitor and employee safety and protection of resources and property.</li> <li>• Develop an emergency operations plan including a hazardous spill response plan to plan for and respond to spills.</li> <li>• Provide a search and rescue program to make reasonable efforts to search for lost persons and rescue sick, injured or stranded persons.</li> <li>• Provide an emergency medical services program to provide for the care of the ill and injured, including emergency pre-hospital care and the emergency medical transport of sick and injured by <u>ambulance</u> <del>hospital</del> from the park's remote setting to medical help.</li> </ul>	

SUSTAINABLE DESIGN AND DEVELOPMENT	
Sustainability is the result achieved by managing units of the national park system in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of developments and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques.	
Desired Condition	Source
NPS and concessioner visitor management facilities are harmonious with park resources, compatible with natural processes, aesthetically pleasing, functional, as accessible as possible to all segments of the population, energy-efficient, and cost-effective.	NPS <i>Management Policies</i> 2006; EO 13123, "Greening the Government through Efficient Energy Management"; EO 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition"; NPS <i>Guiding Principles of Sustainable Design</i> ; DO 13, "Environmental Leadership"; DO 90, "Value Analysis."
All decisions regarding park operations, facilities management, and development in the park — from the initial concept through design and construction — reflect principles of resource conservation. Thus, all park developments and park operations are sustainable to the maximum degree possible and practical. New developments and existing facilities are located, built, and modified according to the <i>Guiding Principles of Sustainable Design</i> (NPS 1993) or other similar guidelines.	"Greening Federal Facilities: An Energy, Environmental, and Economic Resource Guide for Federal Facility Managers and Designers," 2 <sup>nd</sup> ed.
Management decision-making and activities throughout the national park system should use value analysis, which is mandatory for all Department of the Interior bureaus, to help achieve this goal. Value planning, which may be used interchangeably with value analysis/value engineering/value management, is most often used when value methods are applied on general management or similar planning activities.	Director's Order 90 "Value Analysis"
Actions	
<p>The NPS <i>Guiding Principles of Sustainable Design</i> (1993b) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used in the design and management of tourist facilities that emphasize environmental sensitivity in construction, the use of nontoxic materials, resource conservation, recycling, and integrating visitors with natural and cultural settings. Sustainability principles have been developed and are followed for interpretation, natural resources, cultural resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operations. The Park Service also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems emphasizing the use of renewable energy sources.</p> <p>In addition to following these principles, the following also will be accomplished:</p> <ul style="list-style-type: none"> <li>• Have NPS staff work with appropriate experts to make park facilities and programs sustainable. Perform value analysis and value engineering, including life cycle cost analysis, to examine the energy, environmental, and economic implications of proposed developments.</li> <li>• Support and encourage suppliers, permittees, and contractors to follow sustainable practices.</li> <li>• Address sustainable practices within and outside the national park in interpretive programs.</li> <li>• Promote the reduction, reuse, and recycling of materials; support the rehabilitation (recycling) of existing buildings and facilities over new construction; require new developments or modifications of existing facilities to be built using NPS sustainability guidelines.</li> <li>• The park uses water, and energy conservation technologies and renewable energy sources whenever possible. Biodegradable, nontoxic, and durable materials are used in the park whenever possible. Park personnel promote the reduction, use, and recycling of materials and avoid as much as possible materials that are nondurable or environmentally detrimental or that require transportation from great distances.</li> <li>• Promote and encourage modes of transportation other than the single-occupancy vehicle.</li> <li>• Promote land use planning for transportation that can efficiently meet human needs and can be responsibly planned to conserve the finite resources.</li> </ul>	

TRANSPORTATION TO AND WITHIN THE PARK	
Current laws and policies require that the following conditions be achieved in the national park:	
Desired Condition	Source
<p>Visitors have reasonable access to the park, and there are connections from the park to regional transportation systems as appropriate. Transportation facilities in the park provide access for the protection, use, and enjoyment of park resources. They preserve the integrity of the surroundings, respect ecological processes, protect park resources, and provide the highest visual quality and a rewarding visitor experience.</p> <p>The National Park Service participates in all transportation planning forums that may result in links to parks or impact on park resources. Working with federal, tribal, state, and local agencies on transportation issues, the National Park Service seeks reasonable access to parks, and connections to external transportation systems.</p>	<p>"NPS Transportation Planning Guidebook," p.1.</p> <p>NPS <i>Management Policies 2006</i></p>
Actions	
The National Park Service will take the following kinds of actions to meet legal and policy requirements related to transportation to and in the national park system unit:	
<ul style="list-style-type: none"> <li>• Work with gateway communities and local, regional, state, and federal agencies to develop a regional approach to transportation planning between local communities and the park.</li> <li>• Work with the U.S. Department of Transportation, the Federal Highway Administration, the Texas Department of Transportation, and other sources to seek funding and staff to participate in and encourage effective regional transportation planning and enhancements, including both road and nonroad transportation needs (e.g., bikeways, road signs, historic preservation, traffic calming devices, roadside rest area enhancements, and gateway community enhancements).</li> <li>• Advocate for corridor crossings for terrestrial and aquatic wildlife, and other accommodations to promote biodiversity.</li> <li>• Avoid or mitigate (1) harm to individual animals, (2) the fragmentation of plant and animal habitats, and (3) the disruption of natural systems.</li> </ul>	

UTILITIES AND COMMUNICATION FACILITIES	
Current laws and policies require that the following conditions be achieved in the national park:	
Desired Condition	Source
Park resources or public enjoyment of the park are not denigrated by nonconforming uses. Telecommunication structures are permitted in the park to the extent that they do not jeopardize the park's mission and resources. No new nonconforming use or rights-of-way are permitted through the park without specific statutory authority and approval by the director of the National Park Service or his representative, and are permitted only if there is no practicable alternative to such use of NPS lands.	Telecommunications Act; 16 USC 79; 23 USC 317; 36 CFR 14; NPS <i>Management Policies 2006</i> ; DO 53A, "Wireless Telecommunications"; Reference Manual 53, "Special Park Uses."
Actions	
<p>The Telecommunications Act of 1996 directs all federal agencies to assist in the national goal of achieving a seamless telecommunications system throughout the United States by accommodating requests by telecommunication companies for the use of property, rights-of-way, and easements to the extent allowable under each agency's mission. The National Park Service is legally obligated to permit telecommunication infrastructure in the parks if such facilities can be structured to avoid interference with park purposes.</p> <ul style="list-style-type: none"> <li>• Locate new or reconstructed utilities and communications infrastructures in association with existing structures and along roadways or other established corridors in developed areas. For reconstruction or extension into undisturbed areas, select routes that will minimize impacts on the park's natural, cultural, and visual resources.</li> <li>• Place utility lines underground to the maximum extent possible.</li> <li>• Work with service companies, local communities, and the public to locate new utility lines so that there is minimal effect of park resources.</li> <li>• Follow NPS policies in processing applications for commercial telecommunications applications.</li> </ul>	

## **APPENDIX D: WILDERNESS ELIGIBILITY ASSESSMENT**

### **INTRODUCTION**

Guadalupe Mountains National Park was established in 1972 with a gross acreage of 76,293 acres. Congress designated 46,850 acres of wilderness within the park in 1978. Approximately 10,000 acres of land were added to the park in 1997, and this wilderness eligibility assessment determines which areas are eligible for further wilderness study. This wilderness eligibility assessment supersedes an assessment undertaken in 2002-2003 which was never completed. This revised assessment incorporates additional data.

This eligibility assessment finds that 35,484 acres are eligible for further wilderness study. The next step would be for the National Park Service to conduct a formal wilderness study, including an environmental impact statement and formal hearings, followed by a recommendation to Congress. Congress can choose to act on those findings and designate wilderness. The National Park Service will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed.

### **WILDERNESS ELIGIBILITY CRITERIA**

The National Wilderness Preservation System was established by Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. National Park Service lands will be considered eligible for wilderness if they are at least 5,000 acres or of sufficient size to make practicable their preservation and use in an unimpaired condition, and if they possess the following characteristics (as identified in the Wilderness Act):

- The earth and its community of life are untrammelled by humans, where humans are visitors and do not remain;

- The area is undeveloped and retains its primeval character and influence, without permanent improvements or human habitation;
- The area generally appears to have been affected primarily by the forces of nature, with the imprint of humans' work substantially unnoticeable;
- The area is protected and managed so as to preserve its natural conditions; and
- The area offers outstanding opportunities for solitude or a primitive and unconfined type of recreation.

### **WILDERNESS ELIGIBILITY ASSESSMENT**

A significant portion of the assessment lands generally appear to have been affected primarily by the forces of nature with minimal evidence of human activity. These areas of Guadalupe Mountains National Park offer tremendous opportunities for solitude and primitive and unconfined recreation.

The eligible areas are divided into six units. The units are (1) the newly acquired Salt Basin Dunes on the parks west side of approximately 9,126 acres, (2) The Patterson Hills and Bajadas of approximately 22,776, (3) Guadalupe Peak and Pine Springs Canyon of approximately 960 acres, (4) Bear Canyon of approximately 83 acres (5) Eastern Escarpment of approximately 1,550 acres and (6) Basin and Range of approximately 989 acres. The total eligible area composes approximately 35,484 acres. Unit 1 represents land added to the park in 1997 and has never been studied for its wilderness eligibility. The other five units are areas contiguous to the present designated wilderness and were left out of the original Wilderness Study for reasons that no longer affect their eligibility.

Unit 1 is the recently acquired Salt Basin Dunes on the west side of the park and consists of 9,126 acres. Although the Salt Basin addition is most noted for the dune

formations, the dunes are home to over 40 plant species. Additionally, a number of archaeological resources are found within the area.

Unit 2, The Patterson Hills and Bajadas, is virtually undeveloped. The area retains its early ranching history character of windmills and dilapidated fence lines. This unit contains the Williams Ranch settlement and the associated primitive access cad. Unit 2 directly abuts the existing designated wilderness and be the home for future populations of Desert Bighorn. The Patterson Hills and associated Bajadas are classic Chihuahuan Desert habitat. This area has excellent opportunities for solitude. This unit also contains significant geological resources.

Unit 3 is the Guadalupe Peak Section which is the highest peak in Texas and the park's namesake. This 960 acre addition will help in the preservation of the incredible scenic vistas obtainable from the peak and associated vantage points. This unit also contains significant geological resources. This area has excellent opportunities for solitude.

The Bear Canyon unit (4) consists of approximately 83 acres. This unit contains vestiges of the park's early ranching history. Like the Guadalupe Peak Trail, the Bear Canyon Trail provides for incredible plant diversity as well as spectacular scenic vistas. This area has excellent opportunities for solitude.

Unit 5 is the Eastern Escarpment and consists of approximately 1,550 acres. This unit abuts existing designated wilderness and contains significant geological resources. In addition to cave resources, this unit contains significant geological resources.

The Basin and Range unit (6) is approximately 1,024 acres in size. This area has excellent

opportunities for solitude and abuts existing wilderness. In addition to its remote character, the area contains significant geological resources.

### **LANDS NOT CONSIDERED FOR WILDERNESS ELIGIBILITY ASSESSMENT**

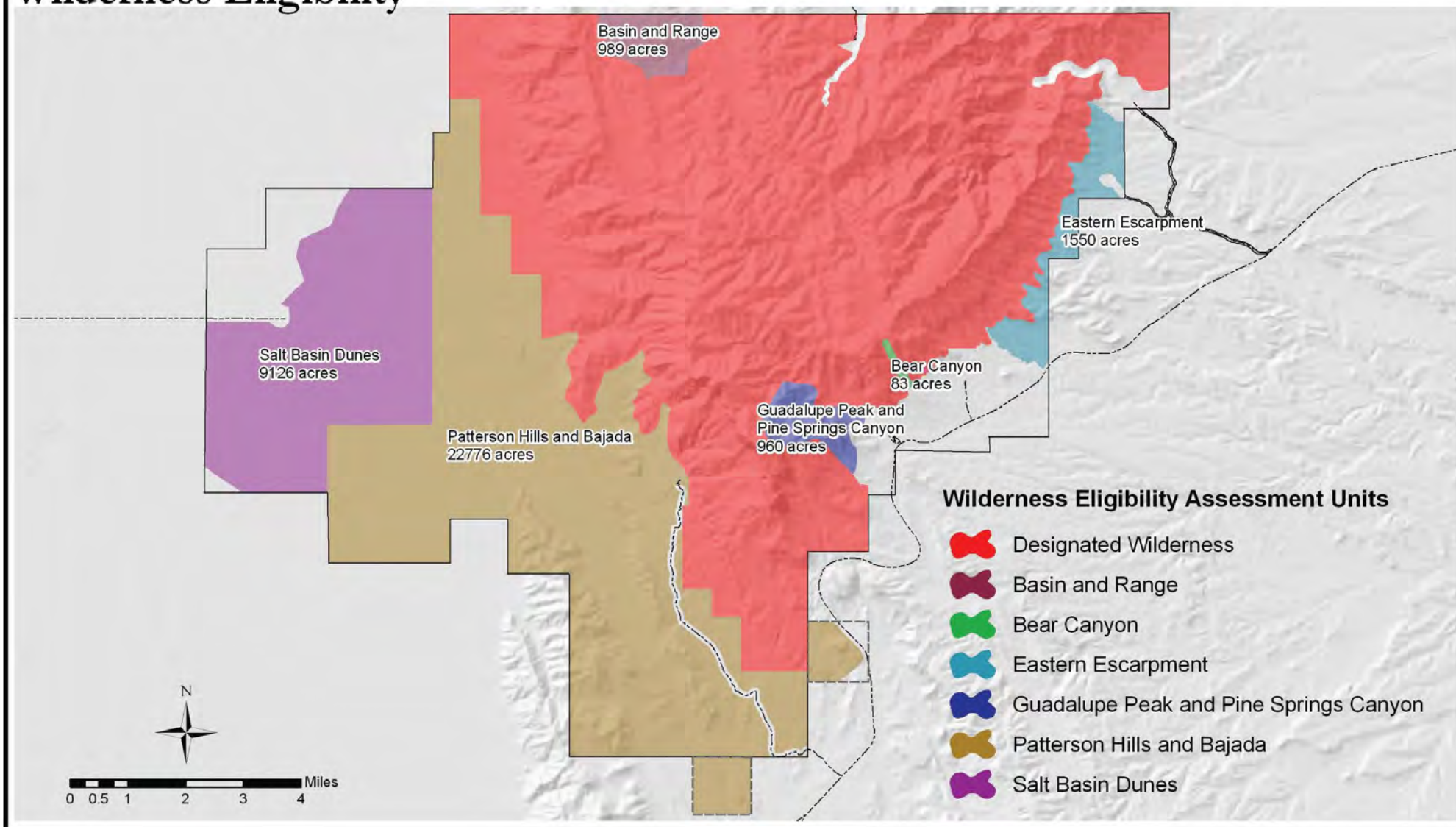
Roughly 2,000 acres were not considered for inclusion in the wilderness assessment. Those acres include those lands north of the Sand Dunes access road and the PX Well road. Additional land excluded from the assessment is the Rio Grande Electric Corporation utility line and El Paso Natural Gas pipeline. These lands show considerable human impact due to the nature of the previous use. This area is adjacent to open views of an active gravel mine. There are several two-track roads within the area. The electric utility company retains an active right-of-way along the power line. The area has a diminished level of opportunities to experience a primitive and unconfined recreational experience.

### **CONCLUSION**

Approximately 35,487 of the 37,536 acres assessed have been found to possess wilderness characteristics and values, and warrant further evaluation in a wilderness study. Management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation. The management prescriptions in the general management plan (preferred alternative) have zoned all the areas found eligible for wilderness as backcountry to ensure their wilderness qualities are maintained until such time as a wilderness study is completed.



## Wilderness Eligibility







## APPENDIX E: RESULTS OF CHOOSING BY ADVANTAGES ANALYSIS

A workshop to choose a preferred alternative was held on January 28-30, 2003, in the park. Participants included staff from the park, the NPS Denver Service Center, the NPS Intermountain Support Office, other parks, and the NPS Harpers Ferry Center. The choice was made through the choosing by advantages (CBA) process. This is a logical, trackable process in which a multidisciplinary team compares the costs and benefits of alternatives. Benefits are judged by the degree to which alternatives provide *advantages* in meeting designated *evaluation factors*. Three conceptual alternatives had been developed in previous workshops. The purpose of this workshop was to choose a preferred alternative from the three, and incorporate any additional elements that would increase benefits and/or decrease costs and negative impacts. The three alternatives can be summarized as: A — maintain current conditions; B — promote wilderness values, restore natural ecosystems, enhance visitor experiences; and C — expand opportunities for enjoyment, promote wilderness values, mitigate resource impacts.

Evaluation factors were developed by the participants and included

- protecting natural resources
- preserving cultural resources
- providing for visitor experience/ orientation through direct resources interaction
- providing for visitor understanding/ appreciation through education and orientation
- promoting wilderness experiences, values, and protection
- improving operational efficiency and sustainability

Participants also evaluated the environmental impacts of the alternatives.

Comparing the benefits or advantages of the three alternatives according to the evaluation factors led to the selection of alternative B as the initially preferred alternative (see table F-1). Alternative B provided the greatest benefits in achieving the evaluation factors and meeting the mission and purpose of the park. Then alternative B was further improved by adding elements from the other alternatives that increased benefits and/or decreased costs. Subsequent work was done to assess costs and further improve the effectiveness of the actions in the preferred alternative.

**Table E-1: Results of Choosing by Advantages Analysis**

FACTOR	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>1. Protecting Natural Resources</b>			
Attributes Footprint Restoration Impacts of use Interpretation / education Development access Invasive species, horse use, visitor use, restoration	Maintain existing development footprint Maintain existing access Day horse use only Restore social trails Revegetation Maintain range of activities	(no septic: McKittrick or Frijole) Rearrange/concentrate Remove development footprints Wilderness threshold—McKittrick Canyon, Pine Springs area Active access management, concentration No horse use Emphasize restoration/preservation (trail, springs campground)	Disperse, increase footprint Frontcountry zone-McKittrick Canyon, west side, Pine Springs area Additional access points, roads, trails, leave Increased horse use Mitigate impacts of visitor access/ use (septic: McKittrick, Frijole) Dispersed use, more universal access
		Enhance frontcountry access, interpretation services; concentrate Limit range of activities Consider additional research natural areas.	Expand range of activities Education to protect resources emphasized Enhance access to resource natural areas
Advantages	Maintain (existing conditions) current situation (low level of loss) adequate protection; minor long-term impacts	Decrease loss of resources due to decreased/ concentrated footprint and managed visitor use; and less diverse Fewer long-term impacts; increased protection Improved conditions	Increased loss of resources due to expanded footprint, more dispersed use (McKittrick Canyon, road, campground, contact station); modest long-term impacts; adequate protection; incur minimal loss
<b>2. Preserving Cultural Resources</b>			
Attributes; Historic structures Cultural landscapes Museum collections Visitor use Rehab/adaptive use	Maintain current treatment of structures; (mostly stabilization, some rehab) (adaptive use in Frijole Ranch house) Continue Frijole Ranch, other cultural landscapes Museum collection in park mostly.	Some nonsignificant cultural resources/structures removed or allowed to deteriorate; some adaptive use Remove Frijole Ranch picnic area Preserve/rehabilitate cultural landscapes Museum collection in facility in or near park Manage/limit access (building interiors, road to Williams Ranch)	(remove hazards) Rehabilitation and adaptive use and stabilization of historic structures Adaptive use and rehabilitation of landscapes Museum collection outside park: partnership; regional facility Provide access to cultural structures/resources
Advantages	Maintain current conditions; chiefly stabilization	Preserve and rehabilitate significant resources; removal activity of nonsignificant resources; more historic fabric preserved; local control of collection	Preserve and rehabilitate significant resources Plus adaptive use/rehabilitate including nonsignificant resources Increased visitor use & access Some historic fabric lost to adaptive reuse Regional collection facility

**Table E-1: Results of Choosing by Advantages Analysis (Continued)**

FACTOR	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>3. Providing for Visitor Experience and Orientation through Direct Resources Interaction</b>			
Attributes: Access Physically challenged	Maintain current conditions.	Same road and trail access as A, but no horse use Pine Springs campground removed Frijole Ranch picnicking removed; moved to Pine Springs Emphasis on frontcountry and backcountry/wilderness (extremes rather than range)	Expand road and trail access Pine Springs RV and group camping removed Additional campgrounds Dog Canyon campground added New Frijole Ranch picnic area (near) West side campground and trailheads Broad range of visitor experiences Possible overnight horse use West side road experiences especially for 2-wheel-drive mountain bike Extended hours in McKittrick. Possible shuttle to trailheads.
Advantages	Diverse opportunities for direct experiences (more than alternative B)	Enhanced visitor center experience More direct access to backcountry/ wilderness (don't need to go through frontcountry) More opportunity for high-challenge experiences Less opportunity for physically challenged visitors and nonhikers	Provides more choices for experiences sense of security; Appeals to more types of visitors than alternatives A or B More convenient access Improved facilities, amenities facilitate use at developed areas More access points to trailheads; improved trailheads More opportunity for physically challenged, nonhikers.

**Table E-1: Results of Choosing by Advantages Analysis (Continued)**

FACTOR	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>4. Providing for Visitor Understanding/ Appreciation through Education and Orientation</b>			
Attributes	Provide diverse interpretation opportunities; current conditions; understand wilderness values, backcountry experiences	Enhanced media, facilities, services at visitor center and visitor contact stations Cultural interpretation at Pine Springs visitor center Emphasize modern technology, interactive, multisensory media experiences Outreach same as alternative A Ship-on-the-Desert for research Few waysides.	Visitor center, visitor contact stations as in alternative A Enhance outdoor interpretation media, services Living history at Frijole Ranch Emphasize expand outreach Ship-on-the-Desert a residential education center More staff/VIP's on trails? More personal services Lots of waysides.
Advantages	Diverse program Moderate ability to adapt/ change messages	Visitor center experience more compelling, multisensory Emphasize media Little flexibility to change messages	Active outreach builds constituency Increased personal services contacts in field (Emphasize personal services) On-site education experiences (Ship-on-the-Desert) Substantial/flexibility to change messages
<b>5. Promoting Wilderness Experiences, Values, and Protection</b>			
Attributes	Variety of interpretive services Access: Moderate	Media experiences emphasize wilderness understanding/ appreciation Horse restrictions, narrow trails High opportunity for solitude Access: direct Maximum acreage as backcountry/wilderness Consider additional research natural areas	Media-same as alternative A; enhanced field contacts Access enhanced; road, staging areas, trail Moderate opportunity for solitude (except enhanced opportunity on west side) Trails accommodate horses Additional trailheads; possible additional trails
Advantages	Substantial wilderness and access Day horse use	No horses or apples More wilderness management (2,500 acres) More constrained access than alternative C: hikers only	Horse use-horse backcountry/ wilderness experience- increased access for physically challenged More access to the backcountry and designated wilderness than alternative B: hikers, horses, cars (west corridor), physically challenged.

**Table E-1: Results of Choosing by Advantages Analysis (Continued)**

FACTOR	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>6. Improving Operational Efficiency and Sustainability</b>			
Attributes	Existing Pack operations at Frijole Ranch	Remove electric/water at Pratt Cabin, McKittrick Canyon Museum collection in or near park Pine Top cabin removed Potable water storage enlarged Structures same as alternative A; no new facilities; some rehabilitation. Relocate some operations outside park Pack operation at maintenance area.	Additional housing on west side Utilities and water to west side Regional museum collection Upgrade Pratt/McKittrick utilities Utility infrastructure upgraded Dog Canyon fire management building Additional structures at west side and Pine Springs Pack operation same as alternative B
Advantages	No new structures Museum collection accessible No new horse corral No utility maintenance at Pratt	No increased need for expanded utilities (no new structures) Museum collection accessible to park staff Building space at Frijole Ranch freed from pack operations No utility maintenance needed at Pratt.	Improved infrastructure, facilities help meet health and safety codes Better access to Williams Ranch Additional office space would meet needs Partnership efficiencies: Frijole Ranch, museum collection, also at Ship-on-the-Desert Frijole Ranch building space- as in alternative B Museum collection and other operations out of floodplain Keep park staff together.



## APPENDIX F: CATEGORIZED PUBLIC SCOPING COMMENTS

The following summarized comment responses were collected from members of the public from April to July 2000. Public comments included over 150 written responses to the first GMP newsletter and over 200 verbal comments at one of six public scoping meetings. The planning team combined similar comments, summarized them, and separated them into five categories of management including: resource management, public use and access, facilities and operations, public interpretation and education and external relationships. As the GMP is an over-arching plan that is “general” in addressing park issues, the individual public comments will fall into one of four groups.

1. Actions that cannot be taken due to inconsistency with regulation, law, or policy.
2. Actions that must be taken because they are already mandated by regulation, law, or policy.
3. Interests or concerns that are appropriately addressed by the GMP.
4. Interests or concerns that are appropriately addressed by a more detailed park implementation plan that is not part of, but tiers off of the GMP (i.e. fire management plan, development concept plan, trails plan, etc.).

The comments that fall into groups 1, 2, and 4 should be addressed in the GMP by clarification of pertinent regulations, laws and policy or by reference to an existing or needed park implementation plan. The comments that fall into group 3 have been used to develop key “decisions points” that will be a valuable reference tool for guiding the development of planning alternatives.

### RESOURCE MANAGEMENT

1. Conservation of Chihuahuan Desert.
2. Preserve fragile ecosystems.
3. Boundaries should be more reflective of ecosystems represented.
4. Preserve the open landscape.
5. Manage as part of larger National Park system that protects sustainable ecosystems.
6. Address mistletoe problem and protect the few madrone trees.
7. Park is a special place where natural processes govern management.
8. Eliminate the elk policy.
9. Allow grazing to enhance habitat management.
10. More prescribed fires in association with park neighbors.
11. More emphasis on the rich cultural history of the park.
12. Park represents the interactions of man and nature.
13. Designate more areas as day-use-only like McKittrick Canyon.
14. Identify areas for park expansion, i.e. south and west (support Capitan Reef Nat. Monument).
15. Close association with universities to develop baseline resource data.
16. Spread water around to share with wildlife by opening springs around the park.
17. Reintroduce extirpated species and protect threatened species and predators.
18. Protect viewsheds on park’s southeastern side and on road to McKittrick Canyon.
19. Potential for adjacent private landowners to erect additional communications towers south of Guadalupe Pass.
20. The responsible use of parkland (agriculture) would help conserve it.
21. Archeological resources are in danger in dunes area, more protection needed including personnel needed on site (emergency phone needed).
22. Need to enhance habitat (water) to support wildlife in uplands.

23. Establishing a “grass bank” in the park would be an integrated vegetation management approach to fire / weed management and exotic pests.
24. Institute predator control.
25. Preserve evening sky at dunes, w/ some program opportunities.
26. Protect open visual qualities of neighboring lands on west side.
27. Need to protect viewsheds on south and southeast along highway.
28. Favor native restoration over preservation of cultural resources and practices.
29. Remove exotic wildlife.
30. Interested in reintroduction of native species.
31. Promote habitat restoration.
32. Cooperation with locals and other agencies on protection of resources and historic sites (i.e., Mission Trail).
33. Park is small incomplete ecosystem full of exotic plant and animal species.
34. Protect resources and pristine nature.
35. Improved protection and restoration of historic structures.
36. Develop baseline data to better determine changes and management response.
37. Wilderness is a refuge for plants and animals.
38. Significant biological areas (Pine Springs) are not natural and continue to be disturbed.
39. Utilize “best management practices” including fire, hunting and grazing.
40. Archive existing geological specimens at Ship-on-the-Desert Research Center or Texas Bureau of Economic Geology and catalog for research reference to minimize new field sampling.
41. Protect outcrops of reef morphology and Permian stratigraphy for future study.
42. Maintain biodiversity.
43. Natural ecosystems should be allowed to work without influence of man.
44. Sanitary facilities may be needed to protect resources in the backcountry.
45. Establish the park as part of a wildlife corridor from Mexico to Canada.

## PUBLIC USE AND ACCESS

1. Land belongs to the public and should be accessible to all.
2. Park experience is for everyone’s enjoyment.
3. Limit public use in fragile areas.
4. Park is not a “playground”.
5. Need to visit multiple times to see park’s many resources.
6. Rugged spiritual beauty in a remote, uncrowded setting.
7. More access to trails, hiking experience.
8. Allow access to areas by ATV’s for those that are not physically able to hike.
9. Allow people to get off the established improved trail.
10. Open the park to everyone; make it more accessible to the elderly and handicapped.
11. Value of being away from roads and vehicles.
12. Consider seasonal road closures to address overuse and potential ORV restrictions.
13. Designate more trails and camping areas.
14. Close the vehicle road to Williams Ranch.
15. Move parking lots away from trail entrances to discourage visitors from over-using trail system.
16. Build all weather gravel road from Dell City to west side entrance of park & Williams Ranch.
17. Want a drive-through experience.
18. Provide water in the Bowl and other remote places for visitors.
19. Develop grazing opportunities within park.
20. See more wildlife.
21. Limit overall numbers of backcountry users due to potential for overcrowding.
22. Regulate and redistribute numbers of campers to popular backcountry campsites.
23. A campground with no wind.
24. Develop hunting opportunities.
25. Desire freedom from over-development.
26. Continue as a backpacking park.
27. Interpretive trail for the Shumard Canyon & guidebook for Western Escarpment.



28. More wilderness experiences.
29. More ATV trails for older Americans.
30. More opportunities to visit unique scenic areas.
31. Preserve remoteness, quietness and solitude.
32. Expand trails open to horseback riding.
33. Open to mountain bikes.
34. More nature walks.
35. Would like car camping facilities.
36. Hold more open houses at the Ship-on-the-Desert.
37. Develop an interpretive trail about geology and establish with key viewpoints with waysides.
38. Enjoy natural world – scenic vistas, geology, native plants and animals, cultural history.
39. More cross-country camping experiences, away from developed backcountry campgrounds.
40. Need to remember recreation opportunities for elderly or disabled visitors.
41. More access to dune area by developing public road & tours.
42. Accessibility for disabled needed on west side of park.
43. Horseback trails on the west side.
44. Develop opportunities to experience west side escarpment (i.e. pay binoculars at facility).
45. Trail waysides along new dunes trail.
46. Develop camping opportunities on west side (primitive only).
47. Climbing policy needs to be revisited, some areas are suitable for climbing.
48. Limit visitors to Dunes to preserve the character.
49. Overnight opportunities for horse and campers in back country.
50. Need to address more suitable area for RV's.
51. Protect the sense of wilderness and avoid development.
52. Why have a wilderness if folks can't enjoy it?
53. Hiking, backpacking, and camping.
54. Scenic vistas should be conserved.
55. Park always envisioned as a wilderness park to protect the "island in the sky".
56. Continue "low impact" visitation opportunities with minimal infrastructure.
57. Enlarge Wilderness Study Area to provide more primitive recreation opportunities.
58. Other national and state parks in Texas satisfy more developed recreation; Guadalupe National Park was conceived as a wilderness-experience park.
59. Lack of development is unique and cherished.
60. Wilderness means little access.
61. Wilderness designation is discriminatory to a large number of users that can't access.
62. Wilderness should be small percentage of parklands as only young folks in good physical shape can enjoy it.
63. Changing visitor trends are not an excuse for destroying a beautiful wilderness.
64. Keep human intrusion to a minimum.
65. Current wilderness is too heavily used.
66. Access to wilderness by foot only.
67. No artificial provision of water.
68. Provide water in wilderness to enhance wildlife.
69. Make wilderness accessible i.e. paving and steps.
70. Some areas should have no trails, improvements or human visitors.
71. Reconsider allowing traditional wilderness uses like horseback use.
72. Exclude public use of horses in the backcountry (erosion, flies, and intrusive plants).
73. Horse access should be limited to certain trails and no overnight visits w/ horses.
74. Push a road south to the rim, to allow more people access to the backcountry.
75. Equal balance of public interests and needs should be represented in wilderness management.
76. Provision of water wells in the north wilderness would permit more people to enjoy it.
77. Preserve solitude – experience nature on its own terms.

78. Wilderness should be without maintained trails and signs.
79. Campsite designation may be needed to reduce use impacts.
80. Avoid public use of Pine Top Ranger Station.
81. GMP should lead to enlarged wilderness area with Capitan Reef.
82. Allow use of mountain bikes.
83. Maintain carry in – carry out policy.
84. The west side dunes are for solitude, not recreation.

## FACILITIES AND OPERATIONS

1. Park should have a friendly staff and not be so restrictive.
2. Improve the dilapidated trail to Guadalupe Peak so more disabled people could use it.
3. Make park improvements for economic benefits, parks are for people now, not in the future.
4. Develop Pine Springs as a low impact organic farm.
5. Build residences for rangers working the west side of the park.
6. Build an enclosure for the stagecoach at the Butterfield monument.
7. Manage for staff and visitor diversity.
8. Better markings on trails and roads.
9. Visitor center for the west side dunes.
10. More rangers on the trails.
11. Charge user fee for trail use.
12. Provide opportunities for employees to share ideas and demonstrate follow up to suggestions.
13. Eliminate park staff divisions and promote teamwork.
14. Improve access for scientific research and improve lodging for researchers.
15. Less emphasis on visitor protection activities along highway corridor.
16. Establish a therapeutic retreat camp on adjacent private lands that would be compatible with park use and preservation values.
17. A facility that can accommodate overnight use for visitors that don't camp or backpack.
18. More trail marking — including distances to destinations.
19. No expansion of park, take care (i.e. actively manage) existing park.
20. Wilderness boundary very imperfect and needs to be addressed.
21. Need better facilities for RV camping (i.e. showers).
22. Park facilities on the west side must be designed to have more protection from the sun.
23. Trails from west side to east side of the park, trails to Lincoln N.F.
24. Trail from Williams Ranch to dunes
25. Development on west side would address sanitation and trash problems (i.e. composting toilet).
26. Wilderness values include all areas of park, not just uplands (West side should be mostly wilderness).
27. Park as a model for sustainability wind / solar and low impact technologies.
28. Too many rules & constraints on use in developed camping sites at Dog Canyon; more visitor activity options, need for handicapped improvements.
29. Concern of “privatization” or commercialization of park.
30. Concern about grazing on surrounding lands.
31. Scarring of existing trail development severe.
32. Interconnect trail system from west trailhead.
33. Lessen visual impacts of trails up to the ridge.
34. Frijole was to be restored as it was, not just as a museum.
35. More backcountry patrol.
36. Roadless areas should be preserved and new roads should only be considered in circumstances of great need.
37. Return land to former uses, now animals must travel many miles for water.
38. Don't think like park rangers, think promotion of economic development.

39. Keep it wild and unchanged.
  40. Follow the Wilderness Act.
  41. No campground or through roads on west side of park, but there should be a ranger (contact) station and interpretive site.
  42. Ensure park regulations are vigorously enforced.
  43. Get rangers and park managers into the park and require them to acquire knowledge of plants and animals.
  44. Establish a research institute that provides visiting scientists and researchers with working, living and meeting space.
  45. No RV campground at Pine Springs, it should be east of the highway.
  46. No concessions within the park, private enterprise could provide across the highway outside boundaries.
  47. Need perhaps twice the number of walk-in campsites at Pine Springs, if they can be sited unobtrusively.
  48. No geologic collecting on Geology Trail and no public collecting anywhere.
  49. Park is a training ground for geological research; continue to allow taking laboratory samples.
  50. Want to continue access for research and educational field trips.
  51. Construct a full range of improvements including camping, hiking, and ORV trails.
  52. Remove power lines to Pratt Cabin.
  53. Fees should be based on level of service, recreational opportunities and maintenance needs.
  54. Wilderness should support scientific research of all types.
  55. Better protection for west side of park.
  56. Keep good photo records to monitor sensitive park resources.
  57. No development of any kind in the wilderness area.
  58. Staffing for west-side park facilities (dunes/Dell City).
  59. Improved public campground on east side.
  60. Expand designated wilderness, i.e. Pine Springs, Bear Canyon and western lowlands.
  61. Avoid adding human contrivances and development unless inescapable.
  62. Completion of baseline resource research for the park.
  63. Disagree with implication that park facilities will meet all visitor needs; better statement would be facilities that meet needs consistent with the protection of wilderness and resources.
  64. Proposed park goals make me sick, sounds like locking the gate and not letting anybody in.
  65. Bring scientists to the park by organizing a meeting of past and present resource managers to identify fieldwork to survey and better understand the interrelationships of park resources.
  66. Enhance staff with NPS scientist and provide for visiting scientists from academic institutions.
  67. Founding concept for the park was resource protection and minimal improvements for visitors, these policies should not be compromised for visitor convenience.
  68. Protection of significant park vistas through a variety of means.
  69. Better pay and job security of park staff.
  70. Require permit to hike in the backcountry to improve security and public safety.
  71. Ensure that all staff has common understanding of regulations and their interpretation.
  72. Set up regional partnerships to enhance visitor services.
- PUBLIC INTERPRETATION AND EDUCATION**
1. A full range of educational experiences.
  2. More activities to interpret resources.
  3. Tell why the park was established.
  4. Be friendlier to visitors.
  5. Publicize the Park's special features nationally.
  6. Recommit to science and research program and interpret it to visitors.
  7. Explain the significance of the resources.
  8. Interpretation of wind machines and sustainable practices.
  9. Education opportunities for youth groups (scouts) to learn and experience.

10. Ensure public is aware of geologic history behind spectacular scenery.
11. Produce professionally-written news releases.
12. Ensure public is aware of park goals, agree with them and see progress.
13. Explain the importance of nature and natural systems.
14. More interpretive materials and sources of interpretive messages in the park.
15. Park is the public's responsibility to preserve and maintain and is well worth it.
16. A place for our young people and future leaders to learn natural values.
17. Give introduction to ecology through guided walks, backpack trips.
18. Interpret unique park biota.
19. Counter attitude that the NPS doesn't want people, promote as the greatest place in the world.
20. Communicate concept of wilderness.
21. Add "Flight of Passage" to library and sales offerings.
22. Create meaningful special events that lend themselves to news coverage.
23. Interpret wind and meteorology.
24. Organize volunteers such as local teachers, NPS retirees and others to assist with interpretive program and provide naturalist training to other volunteers (i.e. Pratt Cabin).
25. Promote educational field trips and geological research.
26. Park represents beauty of God's creation.
27. Educational presentations by a circulating naturalist in campgrounds/developed areas.
28. Tell specifically of the ecosystem importance of limestone reef.
29. More emphasis on the rich cultural history of the park.
30. Present American Indian perspective(s) on the landscape.
31. Stress ecological processes, rather than named plants and animals in the interpretation program.
32. Resources give people important messages about life in the natural world.
33. Connection between man and nature.

34. Nature responds to the landscape, the landscape responds to the geology and tectonic history.
35. Describe how humans have left so little for other inhabitants of this planet.
36. Education needed in safety and resource protection and "leave no trace" practices.
37. Improved interpretive relationship with local geologists.
38. A Guadalupe Mountains National Park school program in regional towns would be well received.
39. Push publication of 25<sup>th</sup> anniversary symposium.

## EXTERNAL RELATIONSHIPS

1. Park resources can be impacted by influences outside the park.
2. Seek out relationships with local adversaries and listen to them.
3. Add surrounding land to park in communication and cooperation with park neighbors.
4. Need a citizen advisory committee or routine opportunity for public input.
5. More meetings with the public.
6. Preservation of livelihood and ranching "way of life" is an issue for future generations.
7. No consultation with local people who live on the land.
8. Improve connections between dunes and Dell City tourism.
9. Don't try to inhibit use of surrounding private properties (i.e., wind development).
10. Opportunity for co-op development by private landowners to accommodate visitors and RV's.
11. Concern about expansion of ORV roads outside boundaries.
12. Expand protections to areas around the park, park not island.
13. An expanded national park with full protections.
14. Stronger connections with people in regional area critically needed (education is key).

15. Enhanced relationship with local ranchers.
16. Park needs to be a friendly neighbor to surrounding private lands and never be intrusive.
17. Private property rights need to be respected in mutual management issues (i.e., cougars).
18. Improve outreach to larger regional community.
19. Need to improve getting the word out about the planning effort, lengthen comment period and include cities of Dallas and Austin for meetings.
20. Not good neighbors to folks living next to the park, not people friendly.
21. Seek out fresh viewpoints from American Indian people.



## **APPENDIX G: CONSULTATION LETTERS**

Robert J. Huston, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
John M. Baker, *Commissioner*  
Jeffrey A. Saitas, *Executive Director*



## TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

*Protecting Texas by Reducing and Preventing Pollution*

June 4, 1999

Mr. Stephen E. Stone  
National Resource Specialist  
United States Department of the Interior  
National Park Service  
P. O. Box 25287  
Denver, Colorado 80225-0287

Re: Guadalupe Mountains National Park

Dear Mr. Stone:

The following staff of the Texas Natural Resource Conservation Commission (TNRCC) have reviewed the above-referenced project and offer the following comments:

The Office of Air Quality has reviewed the above-referenced project for General Conformity impacts in accordance with 40 CFR Part 93 and Chapter 101.30 of the TNRCC General Rules. The proposed action is located in Hudspeth and Culberson Counties, which are unclassified or in attainment of the National Ambient Air Quality Standard for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions pose no significant impact upon air quality standards. The minimal dust and particulate emissions can easily be controlled with standard dust mitigation techniques by the construction contractors.

If you have any questions regarding air quality, please feel free to contact Mr. Wayne Young, Air Quality Planning and Assessment Division, at (512) 239-0774.

It has been determined from a review of the information provided that an Application for TNRCC Approval of Floodplain Development Project need not be filed with the TNRCC. Our records show that the community is a participant in the National Flood Insurance Program and, as such, has a Flood Hazard Prevention Ordinance/Court Order. Accordingly, care should be taken to ensure that the proposed construction takes into account the possible Flood Hazard Areas within the community's floodplains. Please notify the community floodplain administrator to ensure that



Mr. Stephen E. Stone

Page 2

June 4, 1999

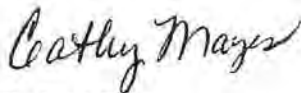
all construction is in compliance with the community's Flood Hazard Prevention Ordinance/Court Order.

If you have any questions, please feel free to contact Mr. Mike Howard, Water Quantity Division, at (512) 239-6155.

The Policy and Regulations Division and the Remediation Division have reviewed the information submitted and have no comments to offer.

Thank you for the opportunity to review this project. If I may be of further service, please call me at (512) 239-3906.

Sincerely,

A handwritten signature in cursive script that reads "Cathy Mayes".

Cathy Mayes

Office of Environmental Policy, Analysis, & Assessment  
Texas Natural Resource Conservation Commission



APPENDIX H: CONSULTATION LETTERS  
United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services Field Office  
10711 Burnet Road, Suite 200  
Hartland Bank Bldg.  
Austin, Texas 78758

JUN 10 1999

2-15-99-I-428

Steve Stone  
Natural Resource Specialist  
National Park Service  
P.O. Box 25287  
Denver, CO 80225-0287

RE: Guadalupe Mountains National Park, Package 214, General Management  
Plan/Environmental Impact Statement, Project Type 02

Dear Mr. Stone:

This responds to your letter, dated May 10, 1999, requesting a list of threatened and endangered species, species of concern, and designated critical habitats from Hudspeth and Culberson counties, Texas. Your request related to the preparation of a General Management Plan/Environmental Impact Statement (EIS) for the Guadalupe Mountains National Park.

As you requested, attached is an updated list of threatened and endangered species and species of concern that may occur in Hudspeth and Culberson counties for your consideration during project planning. There are no areas designated as critical habitat in either of these counties.

Thank you for the opportunity to provide input for this project. We would welcome the opportunity to review and provide comments on the draft EIS, when completed. Please reference the consultation number above for future correspondence regarding this project. The point of contact in our office will be Nathan Allan, at (512) 490-0057.

Sincerely,

*William Seawell*

*for*  
David C. Frederick  
Supervisor

Enclosure

Federally Listed as Threatened and Endangered Species of Texas  
September 23, 2007

This list represents species that may be found in counties throughout the Austin Ecological Services office's area of responsibility. Please contact the Austin ES office (U.S. Fish and Wildlife Service, 10711 Burnet Rd., Suite 200, Austin, Texas 78758, 512/490-0057) if additional information is needed. Please contact the appropriate USFWS field office in Arlington, Clear Lake, or Corpus Christi for projects occurring in counties not listed below.

**DISCLAIMER**

This County by County list is based on information available to the U.S. Fish and Wildlife Service at the time of preparation, date on page 1. This list is subject to change, without notice, as new biological information is gathered and should not be used as the sole source for identifying species that may be impacted by a project.

Migratory Species Common to many or all Counties: Species listed specifically in a county have confirmed sightings. If a species is not listed they may occur as migrants in those counties.

Least tern	(E ~)	<i>Sterna antillarum</i>
Whooping crane	(E w/CH)	<i>Grus americana</i>
Piping plover	(T w/CH)	<i>Charadrius melodus</i>

**Culberson County**

Southwestern willow flycatcher	(E‡)	<i>Empidonax traillii extimus</i>
Gypsum wild-buckwheat	(T)	<i>Eriogonum gypsophilum</i>
Mexican spotted owl	(T‡)	<i>Strix occidentalis lucida</i>
Guadalupe fescue	(C)	<i>Festuca ligulata</i>
Yellow-billed cuckoo	(C)	<i>Coccyzus americanus</i>

**Hudspeth County**

Northern aplomado falcon	(E)	<i>Falco femoralis septentrionalis</i>
Southwestern willow flycatcher	(E‡)	<i>Empidonax traillii extimus</i>
Mexican spotted owl	(T‡)	<i>Strix occidentalis lucida</i>
Yellow-billed cuckoo	(C)	<i>Coccyzus americanus</i>

**INDEX**

Statewide or areawide migrants are not included by county, except where they breed or occur in concentrations. The whooping crane is an exception; an attempt is made to include all confirmed sightings on this list.

E	=	Species in danger of extinction throughout all or a significant portion of its range.
T	=	Species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
C	=	Species for which the Service has on file enough substantial information to warrant listing as threatened or endangered. These species currently have no legal protection. However, addressing these species at this stage could better provide for overall ecosystem health in the local area and may avert potential future listing.
CH	=	Critical Habitat (in Texas unless annotated ‡)
‡	=	CH designated (or proposed) outside Texas
~	=	protection restricted to populations found in the "interior" of the United States. In Texas, the least tern receives full protection, except within 50 miles (80 km) of the Gulf Coast.

# DSC RECORD COPY

DIAMOND RASH GORDON & JACKSON, P.C.

ATTORNEYS AT LAW

300 EAST MAIN STREET

SEVENTH FLOOR

EL PASO, TEXAS 79901-1379

TELEPHONE  
(915) 533-2277

FAX (915) 545-4623

TOM DIAMOND  
NORMAN J. GORDON\*  
RONALD L. JACKSON  
JOHN R. BATOON  
ROBERT J. TRUHILL  
RUSSELL D. LEACHMAN\*\*  
JOSETTE FLORES

ALAN V. RASH  
OF COUNSEL

\*BOARD CERTIFIED - CIVIL TRIAL LAW  
TEXAS BOARD OF LEGAL SPECIALIZATION

\*\*BOARD CERTIFIED - CRIMINAL LAW  
TEXAS BOARD OF LEGAL SPECIALIZATION

Park: GUMO  
Pkg. # 214 P.T.       
Area       
Subject GMP/EIS

RECEIVED

NOV 20 2000

DSC-PM

November 17, 2000

United States Department of the Interior  
National Park Service  
Denver Service Center  
12795 W. Alameda Parkway  
P.O. Box 25287  
Denver, Colorado 80225-0287

Rec'd:       
Pkg. #      P.T.       
      
    

Attention: Mr. Mark Tabor, GMP Planning Team Lead

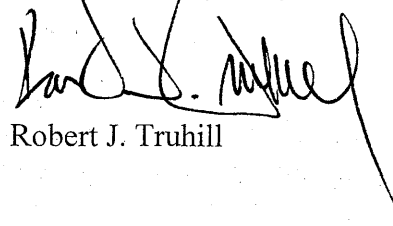
Dear Mr. Tabor:

This will confirm receipt of your letter dated November 14, 2000 in which you transmitted the Draft Alternative Concepts Compilation. The Ysleta Del Sur Pueblo was pleased to be an active participant in the workshop and wishes to continue its active participation throughout the development of the general management plan.

On behalf of the Pueblo, I wish to reiterate the statement which I made to the participants at the workshop in which I advised the participants that the Pueblo and the National Park Service is currently in consultation with respect to the Tribe's cultural affiliation to the Salt Dunes and other parts of the park and that the outcome of that consultation may impact the Draft General Management Plan.

Please continue to keep the Pueblo and its representatives informed of the progress of the development of the Draft General Management Plan Alternatives.

Yours very truly,

  
Robert J. Truhill

RJT/mrc

cc: Governor Albert Alvidrez  
Lt. Governor Filbert Candelaria  
Mr. Rick Quezada, Tribal War Captain  
Mr. Johnny Lopez, Capitan

## APPENDIX H: AGENCY LETTERS, AND RESPONSES TO SUBSTANTIVE COMMENTS ON THE DRAFT GENERAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

### AGENCY LETTERS

Letters that were received from federal and state agencies with regard to the *Draft General Management Plan / Environmental Impact Statement* are reprinted in full at the end of this appendix. No comments were received from local agencies.

### RESPONSE TO COMMENTS

The National Park Service (NPS) is required to respond to substantive comments. Based on section 4.6.A of *Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a):

*Substantive comments are defined as those that do one or more of the following:*

- (a) question, with reasonable basis, the accuracy of information in the EIS.*
- (b) question, with reasonable basis, the adequacy of environmental analysis.*
- (c) present reasonable alternatives other than those presented in the EIS.*
- (d) cause changes or revisions in the proposal.*

*In other words, they raise, debate, or question a point of fact or policy. Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive.*

The NPS' responses to substantive comments are provided below. The arrangement of comments by subject follows the organization of the general management plan and environmental impact statement. The numbers and/or letters following each

comment are database identifiers that enabled the National Park Service to recheck the full text of a comment and its classification if the intent was unclear from an excerpt.

Some substantive comments were made by a single entity, but the National Park Service more often received multiple comments on essentially the same subject. Some comments are provided verbatim or with minor editing for clarity, while others are representative of the comments received from more than one individual or organization.

### PURPOSE AND NEED

#### Purpose and Need - General

1. **Comment:** Additional plans should be referenced in the draft general management plan. (78 137 PN1000 S)

**Response:** Consistent with the requirements of section 4.5.I.1 of *Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a ), the bibliography is limited to the references actually cited in the document.

2. **Comment:** Guadalupe Mountains National Park should apply for World Heritage Designation to increase world awareness of this park. (97 120 PN1000 S)

**Response:** While recognition by others may increase awareness of the park, it would not affect how the National Park Service manages Guadalupe Mountains National Park or the selection of the most appropriate alternative for the general management plan.

3. **Comment:** The land acquisition plan needs to be updated. (239 109 PN1000 S)

**Response:** All land within the park boundary is owned by the National Park Service. This includes 226 acres that has been transferred from The Nature Conservancy to the National Park Service. Any further land acquisition could occur only by an act of Congress, and would have to meet the criteria for inclusion presented in section 1.3 of *Management Policies 2006* (NPS 2006b). As noted on page 125 of the draft general management plan, the park's land protection plan will be updated following completion of the general management plan. The National Park Service also will continue to work cooperatively with surrounding private and public landowners to protect resource and scenic values on these lands, as discussed on pages 21 through 28 in the draft general management plan.

4. **Comment:** The general management plan and environmental impact statement should explain how fuel loading control activities using fire in the wilderness will be conducted to protect the wilderness and its character. (268 152 PN1010 S)

**Response:** A fire management plan is an implementation-level plan that would tier from the final general management plan. As noted on page 125 of the draft general management plan, the park's fire management plan will be updated. The update would have to meet the requirements of *Director's Order 18: Wildland Fire Management* and the specific provisions in *Reference Manual 18, Wildland Fire Management* and multiple interagency guidelines. The plan and associated National Environmental Policy Act compliance document would specify how wilderness and its character would be protected during fuel reduction activities in the designated wilderness and lands zoned as backcountry. Wilderness character would be further protected by the requirement in chapter 7, section 3.2.4 of *Reference Manual 18* that a categorical exclusion cannot be used for any

hazardous fuel reduction projects in wilderness areas.

5. **Comment:** All geological resources do not have to become easily available to the public. Protection of geological resources must come first before any viewing by the public. (324 152 VU1110 S)

**Response:** The National Park Service recognizes the importance of the park's significant geological resources, and all of the alternatives include measures that enhance their protection. None of the alternatives would make these resources easily available to the public.

6. **Comment:** The public does not know that a previous wilderness suitability assessment was conducted by reading the draft general management plan and environmental impact statement. Why? (27 152 WI1030 S)

**Response:** An initial wilderness eligibility assessment completed in 2003 was an internal NPS document and was not released to the public. Page 57 of the draft general management plan describes the assessment, and appendix D presents the results of the signed wilderness eligibility assessment. Appendix D also discusses the need for a wilderness study, which would provide a final NPS recommendation of lands to be designated as wilderness by Congress.

7. **Comment:** Page 58, "Designated Wilderness," the National Park Service states "The park's wilderness management plan would be updated to include specific indicators and standards to achieve wilderness management objectives." What are the wilderness management objectives? Why have these indicators and standards not been developed before now? When will the update process occur? (282 152 WI1030 S)

**Response:** As noted on pages 58 and 125 of the draft general management plan, the park's wilderness management plan would

tier from this general management plan and would be prepared after the record of decision for the general management plan was approved. The wilderness management plan would provide details regarding objectives, indicators, and standards. The wilderness management plan was not prepared previously because of the tiering relationship.

### Purpose and Need – Stakeholders, Publics, and Partnerships

8. **Comment:** Page 15, “Implementation of the Plan, “states, “These steps often involve stakeholder consultation.” What about public consultation? (114 152 CC1000 S)

**Response:** Stakeholders are the public. The public is defined in Director’s Order 75A: Civic Engagement and Public Involvement, as follows:

*The public includes all of the individuals, organizations and other entities who have an interest in or knowledge about, are served by, or serve in, the parks and programs administered by the NPS. They include (but are not limited to) recreational user groups, the tourism industry, Tribes and Alaska Natives, environmental leaders, members of the media, permittees, concessioners, property owners within a park, members of gateway communities, and special interest groups. The public also includes all visitors—domestic and international; those who come in person and those who access our information on the World Wide Web; those who do not actually visit, but value, the national parks; and those who participate and collaborate with the NPS on a longer-term basis.*

The less precise definition of the public that was on page 29 of the draft general management plan has been replaced with the preceding text in the final, and “stakeholders” was selectively replaced

with “the public” or “members of the public” to improve clarity, including in the text that was on page 15 in the draft.

9. **Comment:** A better description of the relationship between “interested stakeholders” and “public” and their roles in the general management plan development process should be provided. (129 152 PN1000 NS)

**Response:** See the response to comment 8. As discussed in the “Public and Agency Involvement” section of the general management plan and environmental impact statement, the public had three primary avenues by which it participated during the development of the plan. These included participation in public meetings, responses to newsletters, and providing written comments, either on paper or via the Internet. These were used to keep the public informed and involved in the planning process for Guadalupe Mountains National Park. A mailing list was compiled that consisted of members of governmental agencies, nongovernmental groups, businesses, legislators, local governments, and interested citizens. Formal and informal consultations, as required, were conducted with other agencies, officials, and organizations. A complete list is provided in chapter 5 of the general management plan and environmental impact statement.

10. **Comment:** Coordination should be held with the Texas Commission on Environmental Quality to address attainment of the regional haze standard. The National Park Service says not one word about this agency proposing in its regional haze state implementation plan that it cannot meet the U.S. Environmental Protection Agency-mandated deadline of 2064 for Guadalupe Mountains National Park. (170 152 CC1000 S)

**Response:** The following information was added to the final general management

plan and environmental impact statement for air quality under “Topics Dismissed from Further Consideration.” The citation at the end was added to the bibliography.

Under the Clean Air Act, federal land managers have an affirmative responsibility to protect the air quality related values, including visibility, of lands in Class I areas. Visibility refers to the clarity with which scenic vistas and landscape features are perceived at long distances. Vistas, including those in national parks, can be obscured by haze, most of which is caused by air pollution particles. When light strikes the particles, some light is absorbed and some is scattered before it reaches an observer. Together, these effects reduce the view’s clarity and color.

The Big Bend Regional Aerosol and Visibility Observational (BRAVO) Study (U.S. Environmental Protection Agency *et al.* 2004) quantified the source of haze in west Texas, at Big Bend National Park. It determined that sulfate compounds are the largest contributor, accounting for about half of the particulate haze. Sources of the sulfate particles included coal-fired power plants, metals smelters, refineries, other industrial processes, and the Popocatepetl volcano in central Mexico near Mexico City.

Guadalupe Mountains National Park is a very small contributor to haze because of the park’s small size; the absence of sulfate particle sources; its largely undisturbed vegetation, which is effective in preventing winds from picking up and transporting large amounts of dust; and the absence of large wildland fires. Because of the park’s minimal contribution, the actions associated with implementing any of the general management plan’s alternatives would have a negligible effect on the ability of the region to meet the state implementation plan for air quality or U.S. Environmental Protection Agency

deadlines. However, regardless of the alternative that is selected, the National Park Service would continue to work at the local, state, and federal levels to move toward achieving the Class I airshed designation of Guadalupe Mountains National Park.

*Citation:* U.S. Environmental Protection Agency, National Park Service, Texas Commission on Environmental Quality, EPRI, and National Oceanic and Atmospheric Administration

2004 *Big Bend Regional Aerosol and Visibility Observational Study, Final Report.* Fort Collins, CO: Interagency Monitoring of Protected Visual Environments. Available on the Internet at: <http://vista.cira.colostate.edu/improve/Studies/BRAVO/reports/FinalReport/bravofinalreport.htm>.

11. **Comment:** Viewshed management should include outreach to area communities and individual landowners so they can understand viewshed importance. (39 120 PN1010 S)

**Response:** As described on pages 21 through 28 of the draft general management plan, the National Park Service currently is pursuing, and would continue to implement cooperative viewshed management with park neighbors.

12. **Comment:** Negotiate scenic easements for those pieces of the property not needed by El Paso Natural Gas Company for all properties between U.S. Highway 62/180 and the park, from the west side of the Patterson Hills to and including the critical viewshed properties approaching and through Guadalupe Pass. (106 123 PN1010 S)

**Response:** See the response to comment 11.

13. **Comment:** Fee acquisition or at least some sort of scenic easements are critical



for the long-range protection of the viewshed along the McKittrick Canyon access road. (18 123 VU1100 S)

**Response:** The National Park Service has no jurisdiction over areas outside the park. The National Park Service would continue to work cooperatively with public and private landowners to protect viewsheds, as presented on pages 21 through 28 of the draft general management plan.

14. **Comment:** The National Park Service should continue with conversations and encourage either fee acquisition or scenic easements for all the properties between U.S. Highway 62/180 and the park, from the west side of the Patterson Hills to and including the critical viewshed properties approaching and through Guadalupe Pass. (24 123 VU1100 S)

**Response:** See the response to comment 13.

15. **Comment:** Viewshed management should be a major part of park activity and should include outreach to area communities and individual landowners so they can understand just how important this is. (48 120 VU1100 S)

**Response:** See the response to comment 13.

16. **Comment:** Scenic vistas: must be preserved. (313 121 VU1100 S)

**Response:** See the response to comment 13.

#### Purpose and Need - Access

17. **Comment:** On pages 37-38, "Basin and Range" and "Western Escarpment / Guadalupe Peak," the National Park Service states Basin and Range resources "are isolated and accessible only with substantial effort" and "Western escarpment geological resources are not accessible for many visitors." Why is this a problem? (110 152 AC1030 S)

**Response:** These features were identified as management issues that could be considered in the development of the alternatives, and are not necessarily "problems."

18. **Comment:** In the discussion of access on pages 253-254, the National Park Service states "and the possible addition of other primitive trails to the park's inventory." What trails are these? (139 152 AL1031 S)

**Response:** These are described on pages 92, 102, and 115 of the draft general management plan. The traces of former ranch roads that are not included on the park's trails map are still evident in many areas of the park. All of the action alternatives would evaluate some or all of these traces to determine their suitability for use as designated trails without adversely affecting park resources (such as increasing soil erosion on unstable slopes). Some of these trails may then be added to the trails map, but improvements would be limited to cairns to mark trail routes in difficult-to-follow areas and, possibly, signs at junctions with other trails.

#### Purpose and Need - Adjacent Lands

19. **Comment:** Provide clarification of how the National Park Service intends to address subdivision development along the park boundary and any associated impacts from the subdivisions. (236 152 MT1000 S)

**Response:** Cooperative actions of the National Park Service with private and public entities are described on pages 21 through 28. The National Park Service would seek agreements with landowners, including the subdivisions along the park boundary, to protect the scenic resources of the park, including vistas of the park from highways and other locations outside the park boundary. The descriptions are at a level of detail appropriate for a general management plan. Specific details will be developed in the course of implementing the plan.

20. **Comment:** The National Park Service must work with the U.S. Forest Service to protect the complete watershed of McKittrick Canyon and the north rim of North McKittrick Canyon. (250 121, 152 PN1010 S)

**Response:** The shared National Park Service and U.S. Forest Service boundary in McKittrick Canyon is described on pages 27 and 28 of the draft general management plan. The National Park Service would continue to work cooperatively with the U.S. Forest Service regarding actions in McKittrick Canyon, especially with regard to fire management.

21. **Comment:** The National Park Service should state which lands outside and adjacent to the park are most important for protecting resources inside the park. (256 152 PN1010 S)

**Response:** The Lands with High Resource Values map on page 23 of the draft general management plan and the corresponding discussion on page 21 identify lands within and outside Guadalupe Mountains National Park that are important nationally or even internationally for their geologic resources or scenic landscape features. The National Park Service works cooperatively with the surrounding private and public landowners to protect resource and scenic values on these lands.

22. **Comment:** The National Park Service should commit to long-term land preservation, protection, conservation, and restoration of these lands outside the park boundary and include a map showing the locations of these lands. (259 152 PN1010 S)

**Response:** See the response to comment 21. The National Park Service does not have management authority for lands outside the park. However, as discussed on pages 21 through 28 of the draft general management plan, the National Park Service will continue to work

cooperatively with surrounding private and public landowners to protect resources and scenic values.

23. **Comment:** Work with the State of Texas to develop additional waysides along U.S. Highway 62/180, specifically at the Salt Flats vista, at one of the Butterfield Trail crossing sites, at Guadalupe Canyon, and the picnic area just down the road from the visitor center. (323 123 PN1010 S)

**Response:** The National Park Service appreciates the suggestion. While this is not a general management plan issue, the National Park Service would continue to work cooperatively with the Texas Department of Transportation, as was discussed on page 26 of the draft general management plan.

24. **Comment:** Land protection issues adjacent to the park that involve energy production must also be included in the land protection plan. (294 109 PN1010 S)

**Response:** As noted on page 125 of the draft general management plan, the land protection plan will be updated following completion of the general management plan. The National Park Service will also continue to work cooperatively with surrounding private and public landowners to protect resource and scenic values on these lands as discussed on pages 21 through 28. An update to the land protection plan would determine any lands or interests in lands that would be needed to meet the purposes of the park.

#### **Purpose and Need – Impact Topics**

25. **Comment:** Air quality, including the effects of carbon dioxide and other greenhouse gas emissions on park natural resources, should be analyzed. Climate change is an air pollution issue that should be analyzed. (53 2, 45, 50, 112, 117, 127, 152 IT1000 S)

**Response:** The Council on Environmental Quality regulations for implementing the

National Environmental Policy Act state that the data and analyses in the environmental impact statement should be commensurate with the magnitude of the impact in order to focus on the analysis of key topics. Based on this requirement, the National Park Service identifies and analyzes impact topics that are associated with the key issues that could be affected by the alternatives at a level of intensity greater than negligible to minor.

As presented on pages 42 and 43 in the draft general management plan, “Topics Dismissed from Further Consideration,” air quality would not be expected to experience any long-term impacts greater than negligible as a result of actions in the alternatives. It was, therefore, dismissed from full analysis in the environmental impact statement. In addition, the *General Management Plan / Environmental Impact Statement* includes a discussion on climate change and carbon footprint in chapter 1; management principles that address climate change in chapter 2; and a discussion of climate change relative to park resources and visitors in chapter 3.

26. **Comment:** The park is classified as a Class 1 air quality management area and should use this status to encourage the U.S. Environmental Protection Agency and Texas Commission on Environmental Quality to address regional air quality conditions sooner than 2064. (326 152 IT1000 S)

**Response:** Regional air quality can affect NPS resources and values such as scenic quality and visitor experience. However, cooperation with other land owners is more an agency issue than a park-specific issue. The National Park Service would continue to work cooperatively with surrounding private and public landowners to protect resource and scenic values. NPS cooperation with the Texas Commission on Environmental Quality, which is the lead environmental agency

responsible for protecting the state’s air, was described on page 27.

27. **Comment:** The general management plan is silent about the Texas Commission on Environmental Quality statements in its regional state implementation plan that its regional haze state implementation plan cannot meet the U.S. Environmental Protection Agency mandated deadline of 2064 for Guadalupe Mountains National Park. This point should be addressed. (333 152 IT1000 S)

**Response:** See the response to comment 10. Regional air quality, including haze, would not be affected by the alternatives long-term or at a greater than negligible intensity. The effects of regional haze result from influences external to the park and would indirectly impact park resources and visitor experience. Implementation plans, such as the resource stewardship strategy identified on page 125, would provide additional consideration of the relationship of park resource management and protection of regional air quality.

28. **Comment:** Provide a climate change ecological resilience and resistance plan to address climate change effects to natural resources in the park. (334 152 IT1000 S)

**Response:** Implementation plans, such as the resource stewardship strategy identified on page 125, would provide additional consideration of the relationship of park resource management and climate change. However, the *General Management Plan / Environmental Impact Statement* includes a discussion on climate change and carbon footprint in chapter 1; management principles that address climate change in chapter 2; and a discussion of climate change relative to park resources and visitors in chapter 3.

29. **Comment:** Numerous details of the scenic vista should be discussed and the basis for its dismissal should be better documented. (205 152 IT1010 S)

**Response:** The visibility of scenic views is based on air quality. See the response to comment 10 regarding air quality and why this impact topic, including haze, was dismissed from further consideration. As noted on pages 21 through 28 of the draft general management plan, the National Park Service will seek opportunities to protect scenic vistas, including viewing points and viewsheds between those points and park features, and will continue to work with neighbors and partners on this issue.

30. **Comment:** Because feral hogs (an exotic species) have been found close to McKittrick Canyon (park location of special-status species), the special-status species and exotic species control impact topics should be analyzed in detail. (217 152 IT1030 S)

**Response:** Feral hogs have been identified in the park. Their management would not change based on the selection of a general management plan alternative.

As described on page 51 of the draft general management plan, exotic species, including feral hogs, are managed consistent with current NPS authorities and policies on exotic species and with state policies related to "pest species." Under Texas law, feral hogs are considered a pest species and can be removed on sight. Under the park's exotic species management plan, monitoring methods have been established to identify exotic species threats, and to prescribe and implement appropriate management response.

31. **Comment:** Because potential future lightscape and soundscape problems have been acknowledged in the general management plan, these impact topics should be analyzed in detail. (228 152 IT1030 S)

**Response:** See response to comment 25 for the criteria used to dismiss impact

topics from full evaluation. Impacts on soundscapes would result primarily from construction activities. Lightscares would be affected by new developments. In both cases, with mitigations on construction activities and appropriate design of lighting in new developments, adverse impacts would not be greater than negligible to minor.

32. **Comment:** Eight additional impact topics dismissed from detailed analysis should have been evaluated in detail: floodplains; wetlands; lightscape management; soundscape management; special status species (threatened and endangered species, species of concern, and designated critical habitats); species restoration, exotic species control, and extirpated species reintroduction; water quality and quantity; and wilderness resources and values. (251 121, 138, 152 IT1030 S)

**Response:** See the response to comment 25 regarding why some impact topics were dismissed from further consideration. Justifications for the dismissal of each impact topic were included in pages 43 through 54 of the draft general management plan. Page 42 and 43 in the draft general management plan provided the criteria that were used to dismiss impact topics from full evaluation.

Brief summaries of the justifications for dismissing **air quality**, **exotic species control**, and **lightscares** were provided in the responses to comments 25, 30, and 31, respectively. Brief summaries of justifications for the other impact topics are provided below.

**Floodplains.** There are no 100-year or 500-year delineated floodplains in the park. However, the Pine Springs visitor center and campground and the Dog Canyon campground are within flash-flood zones. Proposed actions include moving the recreational vehicle and group camping facilities at Pine Springs to

another location within the park and implementing new actions in Dog Canyon. With the implementation of mitigation measures, the long-term impacts on floodplain processes would be negligible or minor. For this reason, the impacts on floodplains related to the implementation of this general management plan are not analyzed further.

**Wetlands.** The National Park Service would perform site-specific planning prior to implementing any proposed construction within designated wetlands. This would include appropriate Clean Water Act and National Environmental Policy Act compliance, including analysis of site-specific impacts. Because the effects of actions at these sites would have no greater than minor intensities, and because impacts would be investigated in depth during site-specific planning, wetlands were dismissed from further analysis at the general management planning level.

**Soundscapes.** Because of the minimal effects that the alternatives would have on the park's natural quiet, soundscape management was dismissed as an impact topic.

**Special Status Species.** Most of the special status plants and animals in Guadalupe Mountains National Park inhabit areas away from existing park development, backcountry trails, and campsites. These areas would not be altered or developed under any of the alternatives. A few state-listed special-status plant species, including the gypsum scalebroom and McKittrick pennyroyal, grow close to existing roads or trails. Before the National Park Service implemented any disturbance under any of the alternatives, it would prepare a detailed development plan and would perform biological surveys. If individuals of these species were detected, the plan would be revised to protect them through avoidance. Therefore, special-status

species were dismissed as an impact topic in this document.

**Species Restoration.** Species restoration and extirpated species reintroduction are considered under other impact topics, including "Plant Communities and Vegetation" and "Wildlife," rather than as separate impact topics. Details regarding future actions will be developed in implementation plans that tier from the approved general management plan. At the time that implementation plans are developed, additional compliance with the National Environmental Policy Act will be completed, as appropriate. Please see pages 124 through 125 of the draft general management plan for a description of future studies and plans to be prepared.

**Water Resources.** None of the alternatives would substantially change the quantity or quality of the park's surface or groundwater sources in either the short or long term. For this reason, impacts on water quality and quantity were eliminated from further consideration.

**Wilderness.** Proposed actions would result in long-term, beneficial impacts to wilderness because visitors could continue to access wilderness areas while wilderness values and character would continue to be preserved for future generations. Consequently, the topic of wilderness values was dismissed from detailed consideration in this document.

## ELEMENTS OF THE ALTERNATIVES

33. **Comment:** What are the locations, acreages, and/or lengths of following elements described in the alternatives: 1) the trailhead and parking lot at PX Well, 2) hiking trails along abandoned trails and road traces on the park's west side to be mapped, 3) Guadalupe Pass Trailhead parking area, 4) Ship-on-the-Desert administrative campground, 5) new campground, 6) new administration

facilities, 7) Salt Basin Dunes visitor day-use area, 8) Williams Ranch visitor day-use area, 9) Dog Canyon group campsite, and 10) frontcountry zones. (133 152 AL1031 S)

**Response:** Specific size, configuration, and location of proposed facilities have not been determined and are not appropriate at this level of planning. The descriptions of the locations, acreages, trails, parking lots, and other proposed developments are presented at the level of detail consistent with the intent of general management planning. Site-specific planning would be completed to determine the size and location of the areas described. Planning would include the preparation of any necessary compliance, such as National Environmental Policy Act disclosure and documentation. Maps of management zones are designed to provide a relative sense of the zone boundaries and not exact areas.

34. **Comment:** The National Park Service could promote better public understanding of the wilderness aspects of the park through the creation of "transition zones." (113 109 AL1000 S)

**Response:** The wilderness threshold zone was established to provide a transition zone that allows visitors to transition from more developed areas of the park into the wilderness and backcountry zones. This zone is included in all of the action alternatives. All management zones are defined on page 59 of the draft general management plan.

35. **Comment:** North McKittrick Canyon and drainage for the entire watershed: Management of the watershed ought to be such that every effort is made to maintain the almost pristine condition of the entire watershed. (260 121 AL1000 S)

**Response:** The natural condition of the parts of the watershed under the NPS'

stewardship would be maintained under any of the alternatives. Most of the watershed is in designated wilderness. As such, management of its current hydrological and biological processes would continue, in the wording of the Wilderness Act, "in such manner as will leave them unimpaired for future use and enjoyment as wilderness" and where the area "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable." In the lower watershed, the wilderness threshold (preferred and alternative B) and frontcountry (alternative C) zoning would continue to protect watershed features and values, as both zones would be managed for high water quality and natural, free-flowing conditions and would allow only minimal facilities.

Much of the watershed is managed by the U.S. Forest Service or is in private ownership. The National Park Service would work cooperatively with surrounding private and public landowners to protect resources outside the park and within the watershed as discussed on pages 21 through 28 of the draft general management plan.

36. **Comment:** On page 79, "Concept," the National Park Service states "surrounding the new Salt Basin Dunes staging area ... an expanded staging area at Williams Ranch." What is a staging area? (142 152 AL1031 S)

**Response:** Staging areas are sites where groups such as hiking parties can gather in one location, park vehicles, organize equipment and people, and make other preparations prior to traveling into the park or hiking a trail. This definition was added to the description of management of the Salt Basin Dunes under the preferred alternative in the final general management plan.

37. **Comment:** Page 241, "Scenic Views," how long is the electric line that will be

removed from McKittrick Creek? (147 152 AL1061 S)

**Response:** The power line is approximately 2.5 miles long.

38. **Comment:** I suggest that elements of alternative C that address the Salt Basin Dune area be included in the preferred alternative for implementation. By providing basic facilities for that area when public use does dictate, much damage can be avoided and the public be accommodated. (75 137 AL1121 S)

**Response:** Both alternatives provide visitor facilities in the Salt Basin Dune area. The National Park Service does not anticipate the amount of visitation that would be necessary to support the suggested development level included in alternative C.

None of the alternatives analyzed in the draft environmental impact statement necessarily represents the final plan. The record of decision may combine some elements of alternatives, such as including Salt Basin Dune area management approaches from alternative C with elements of the preferred alternative to create the final plan. So long as every element in the final plan was considered as part of one or more of the alternatives in the draft plan, a supplemental analysis would not be required.

39. **Comment:** Apparently, the Salt Basin Dune area currently does not draw much public use. However, this could change in the foreseeable future. At least a seasonal employee should be assigned to that side of the park during major park use periods. (77 137 AL1121 S)

**Response:** As described on page 109 of the general management plan, alternative C would include construction of a ranger staff residence at the Salt Basin Dunes. As described in the response to comment 38, the National Park Service does not believe that use of this area would support the need for this level of development.

However, the absence of a permanent residence would not preclude the National Park Service from assigning appropriate staff resources for the protection and interpretation of resources in this part of the park.

40. **Comment:** Historic resources currently play a relatively large role at Guadalupe Mountains National Park. The interpretation of the past and how various cultures lived in the area is something of interest to many visitors. Native American history in the park is certainly an important part of this, as is the relatively minor impact of Spanish exploration in the area. We would hope that the park would not expend an inordinate amount of time and resources exploring the ranch culture. (94 120 CR1000 NS)

**Response:** Important steps following completion of the general management plan would include the development of the long-range interpretive and program management plan, as noted on page 125 of the draft general management plan. In this process, the primary interpretive themes that were presented on pages 17 and 18 would be further developed and an interpretive program that would most effectively tell the important stories of the park to the public would be defined.

41. **Comment:** Ship-on-the-Desert should have permanent interpretive information about Wallace Pratt. (168 123 CR1000 S)

**Response:** Interpretive information related to Wallace Pratt could be appropriate within the context of the cultural history of the park. See page 17 and 18 of the draft general management plan for a discussion of the park's primary interpretive themes. The National Park Service could interpret Wallace Pratt at Ship-on-the-Desert in association with the rehabilitation noted in the preferred alternative on page 87 and in alternative C on page 110. This would be done in a manner that would not impact the cultural landscape.

42. **Comment:** In the preferred alternative, a Butterfield-era stagecoach display would be nice at the Pinery. (261 123 CR1000 S)

**Response:**

A few actions have been modified in this final plan to better respond to resource conditions, park operational needs, or visitor needs. On pages 80 and 107 (preferred alternative and alternative C) of the draft plan, the proposal to build a small new exhibit structure near the Pinery Ruins to house the Butterfield Stagecoach has been modified. The stagecoach could be returned to the park from off-site loan and displayed and protected in the remodeled visitor center once offices were relocated into a new park administrative building.

43. **Comment:** Cultural resources and old home sites should be preserved. Specific resources included the Williams Ranch house, Bowl Cabin, Cox Cabin, Pine Top patrol cabin, McKittrick's Dugout in McKittrick Canyon, and Frijole Ranch. Resources should be added to the National Register of Historic Places. (233 121, 126, 128, 129 CR1010 S)

**Response:** Under all of the alternatives, the park's cultural resources, including historic structures, would be inventoried and their integrity and eligibility would be evaluated under National Register of Historic Places criteria. The National Park Service would manage these resources consistent with their eligibility or listing status, and resources that are eligible or potentially eligible would be managed to maintain their eligibility or potential eligibility. Park cultural resources that already are listed in the National Register of Historic Places, or that are eligible or potentially eligible for listing, are identified on pages 178 through 183 under "Cultural Resources" in chapter 3 (and elsewhere throughout the draft general management plan).

44. **Comment:** Very little is said in the draft general management plan and environmental impact statement about how the National Park Service will protect cryptogamic soils of the Salt Basin Dunes within the alternatives proposed. (192 152 EC1020 S)

**Response:** The terms "cryptogamic" and "cryptobiotic" are generally used interchangeably for living soil crusts that can develop in desert ecosystems. These soils and their importance were described on page 157 of the draft general management plan and environmental impact statement. As described on page 38 in that document, the National Park Service currently uses education measures to teach visitors about the value of cryptobiotic and evaporitic soils and the need to avoid walking on or otherwise disturbing this fragile crust. Such measures would continue, and could be enhanced, under any of the alternatives.

Because the superintendent already is charged with minimizing or preventing adverse, potentially irreversible impacts on soils, including cryptobiotic soils, their protection is not a general management planning issue. Measures for their protection would be included in the park's resource stewardship strategy, which would tier from this general management plan and is referenced on page 125.

45. **Comment:** Page 214, "Mining and Drilling," the National Park Service should ensure that it does all it can to keep drilling from Otero Mesa and Crow Flats. (198 152 EC1020 S)

**Response:** Issues with management of Otero Mesa are largely the responsibility of the Bureau of Land Management; issues with Crow Flat are associated with private landowners; neither is under management responsibility of the U.S. Forest Service.

46. **Comment:** Because Guadalupe Mountains National Park is a wilderness



national park, the wilderness resources and values impact topic should be analyzed in detail. (212 152 IT1030 S)

**Response:** The justification for dismissing wilderness resources and values from detailed analysis is provided on page 52. Consistent with Council on Environmental Quality regulations, the document focuses on the key issues of the plan. Impacts on wilderness would result primarily from short-term trail construction activities and would be highly transitory and timed to minimize disturbances to other resources and the wilderness experience. The intensity of the impact would be negligible and in the long term, the proposed improvements in the trails would improve safe access to wilderness areas. Upgrades of the formal trail system also would reduce the likelihood of visitors creating their own trails, commonly called “social trails.” These actions would result in long-term, beneficial impacts because visitors could continue to access wilderness areas while wilderness values and character would continue to be preserved for future generations. Consequently, the topic of wilderness values was dismissed from detailed analysis. Specific wilderness management actions will be assessed in the Wilderness Management Plan that will tier off this General Management Plan.

47. **Comment:** Because water supply and quality are especially important in desert environments, the water quality and quantity impact topic should be analyzed in detail. (213 152 IT1030 S)

**Response:** The justification for dismissing water quality and quantity from detailed evaluation is provided on pages 51 through 52 of the draft general management plan. Consistent with Council on Environmental Quality regulations, the document focuses on the key issues of the plan. While some construction associated with the action alternatives could change water quality,

the impacts would be short-term and would be minimized through mitigation. Adverse effects associated with increased water use by visitors would have negligible impacts and would not cause hydrogeological changes. Trail maintenance and other actions of park staff would result in beneficial impacts on water quality. This impact topic was dismissed because none of the alternatives would substantially change the quantity or quality of the park’s surface or groundwater sources in either the short or long term.

48. **Comment:** “Conflicts with Land Use Plans, Policies, and Controls” should be analyzed in detail because other portions of the general management plan and environmental impact statement identify threats with this impact topic. (215 121, 138, 152 IT1030 S)

**Response:** The justification for dismissing land use plans, policies, and controls from detailed evaluation is provided on pages 43 and 44. Consistent with Council on Environmental Quality regulations, section 4.5.F.2 of Director’s Order 12 (NPS 2001a) states that an environmental impact statement must consider “possible conflicts between the proposal and land use plans, policies, or controls for the area concerned (including local, state, or Indian Tribe).” Specific land use plans, policies, or controls of these jurisdictions that could relate to general management planning at the park are identified in chapter 4 as part of “Cumulative Impacts and Projects that Make Up the Cumulative Impact Scenario.” Examples of these plans include subdivision development, windmill farms, and potential wind energy development. The cumulative impact analysis for *each* impact topic includes, as appropriate, consideration of possible conflicts between the alternative and the land use plans, policies, or controls of others. Therefore, there was no need to evaluate this as a separate impact topic.

49. **Comment:** Any opportunity to expand the park should be seriously considered. (102 109, 120, LA1000 S)

**Response:** The park boundary can only be expanded by an act of Congress. Recommendations from the National Park Service must meet the criteria for inclusion presented in section 1.3 of *Management Policies 2006*. The National Park Service has identified lands of high resource value, defined as lands that are important nationally or even internationally for their geologic resources or scenic landscape features, but a boundary study would not be undertaken until the general management plan is completed. Until such time, the National Park Service would continue to work cooperatively with landowners to advance its goals. As discussed on page 22 in the draft general management plan, this might involve negotiating preservation agreements, and seeking to acquire or accept donation of lands or seek agreements with adjacent landowners to protect lands considered critical to protecting the scenic integrity or containing significant resources such as geologic resources.

50. **Comment:** Acquisition of more land, particularly on the west and south boundaries, is needed to protect the viewshed; protect geological, biological, and ecological resources; buffer Guadalupe Mountains National Park from incompatible uses; and provide migration corridors for plants and animals due to climate change. (319 109, 267 2, 44, 45, 50, 109, 112, 117, 121, 122, 123, 125, 127, 132, 138, 152 LA1000 S)

**Response:** See the response to comment 49.

51. **Comment:** Specific areas proposed for acquisition include: (1) Salt Flats west and southwest of the park; (2) viewshed along the McKittrick Canyon access road; (3) Bell and Lamar Canyons; (4) Patterson

Hills and Salt Basin; (5) Patterson Hills, Salt Basin and Flats, Guadalupe Pass area, Delaware Mountains, and Guadalupe Escarpment; (6) 10,000 acres of land adjoining Guadalupe Mountains National Park that has just been put up for sale; (7) two parcels of NPS-owned land in the boundaries of Guadalupe Mountains National Park; (8) McKittrick Canyon area; and (9) viewshed between U.S. Highway 62/180 and park through Guadalupe Pass. (283 2, 44, 45, 50, 112, 117, 121, 122, 123, 125, 127, 132, 138, 152 LA1000 S)

**Response:** See the response to comment 49. The two parcels referenced as #7) in this list already are owned by the National Park Service and do not need to be acquired.

52. **Comment:** It would be nice to have some sort of wind-/element-resistant shade structures over some of the picnic tables at McKittrick contact station, the visitor center picnic area, and both campgrounds and at Frijole Ranch. (15 112, 123 VU1080 S)

**Response:** The National Park Service appreciates the suggestion. The zoning for these areas in all alternatives would accommodate these suggestions. Details such as these will be included in plans and designs that tier from the final general management plan.

53. **Comment:** Public use sanitary facilities are needed at Pratt Cabin. This is a relatively heavy use area with many visitors spending a good part of the day in the upper canyon. To expect them not to respond to nature's call through education is somewhat naive. Most of the McKittrick Canyon trail is near the stream course, which is very environmentally sensitive. While water tests currently may not show any stream pollution, it will build up over time if human defecation continues along the stream course. (89 137 WI1020 S)

**Response:** The alternatives considered approaches for restrooms at Pratt Cabin that ranged from no facilities (alternative B) to providing water and toilets (alternative C). On page 85 of the draft plan, the proposal to possibly develop new minimum impact sanitary facilities in McKittrick Canyon has not been carried forward. The National Park Service would prefer to avoid placing such a facility in or near the Pratt Cabin's designated cultural landscape. Therefore, the other approaches identified on page 85 of the draft general management plan would be implemented first, with monitoring to determine their effectiveness.

#### Alternatives - Wilderness

54. **Comment:** Wilderness eligibility and designation should be for 38,134 acres instead of the proposed 35,487 acres. (234 45, 112 AL1060 S)

**Response:** Eligibility was determined based on professional evaluation of land characteristics and on input from the public.

All eligible lands have been identified in the action alternatives either as current designated wilderness or as backcountry zone. *Management Policies 2006* states, "The National Park Service will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. ... All management decisions affecting wilderness will further apply the concepts of "minimum requirement" for the administration of the area regardless of wilderness category." See appendix D for the wilderness eligibility assessment.

55. **Comment:** What areas that were found to be suitable for wilderness in the earlier study have been found not to be suitable by the study that is in appendix D? Why have the 2,650 acres been disqualified for wilderness? (301 152 WI1030 S)

**Response:** As noted in appendix D on page 335 and 336, the 2002-2003 assessment was never completed and, therefore, came to no approved conclusions. As a result, the assessment is not a basis for comparison with the appendix D study results. Consistent with NPS policy, lands that did not qualify for wilderness were found to be ineligible because of the presence of roads, rights-of-way, human impacts associated with previous use, and the visual impacts of uses on adjacent lands

56. **Comment:** On page 79, "Concept" and on pages 75 and 76, "Historic Structures and Landscapes," the National Park Service uses words like preserved, stabilized, protected, and rehabilitated but does not provide a definition and explanation about what these words mean. (241 152 AL1031 S)

**Response:** Each of the alternatives includes a description of the levels of treatment proposed for individual historic structures using terms that are defined in *The Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. The citation for this document is provided in the bibliography under The Secretary of the Interior 1995a. Based on this document, with some differences by resource type, cultural resources are subject to several basic treatments, including (1) **preservation**, which involves ongoing maintenance and repair to sustain a historic property in its existing state, including measures to **protect and stabilize** the property; (2) **rehabilitation**, which makes a property suitable for a compatible use through repair, alterations, and additions while maintaining features that continue to convey its historical values; (3) **restoration**, which accurately depicts the form, features, and character of a property as it appeared at a particular period of time; and (4) **reconstruction**, which

depicts, by means of new construction, the features of a non-surviving site, landscape, or building, when such action is essential to the public understanding of the property. Decisions regarding which treatments would be most appropriate for particular cultural resources would be reached through the planning and compliance process.

57. **Comment:** On page 101, “Interpretive and Educational Outreach Programs and Media,” the National Park Service should explain what “video technology” is and ensure it does not include putting installations and structures in wilderness. (23 152 AL1091 S)

**Response:** Appropriate technologies would be evaluated when implementation of interpretation and education outreach programs and media takes place in an exhibit plan. The intent in developing simulated park wilderness trips would be to provide as realistic an experience as possible through advanced multimedia technology for those visitors who would not otherwise be able to experience wilderness. This would not involve putting installations or structures in wilderness.

Section 6.3.10.1 of *Management Policies 2006* states “Administrative facilities (for example, ranger stations and/or patrol cabins, fire lookouts, radio and/or cellular telephone antennas, radio repeater sites, associated storage or support structures, drift fences, and facilities supporting trail stock operations) may be allowed in wilderness only if they are determined to be the minimum requirement necessary to carry out wilderness management objectives and are specifically addressed within the park’s wilderness management plan or other appropriate planning documents.” Video installations or structures for remote interpretation would not meet this criterion.

58. **Comment:** On page 88 and 102, are primitive sanitary facilities really needed in wilderness? What criteria will be used to decide this? How will wilderness character be protected? The National Park Service needs to give more information about this issue. (120 152 AL1031 S)

**Response:** All of the action alternatives would allow for the installation of primitive sanitary facilities at designated backcountry campsites to protect resources and human health if use levels warrant. The following criterion from page 102 of the draft general management plan would apply to all action alternatives: “Sanitation facilities in wilderness threshold, backcountry, and designated wilderness zones would be provided or improved only in cases of demonstrated need that could not be mitigated by improved education of visitors.”

The updates to the *Backcountry/Wilderness Management Plan* (noted on page 125 of the draft general management plan) would further define the criteria to be used in deciding whether to place sanitation facilities in these areas. In all cases, sanitation facilities in the park’s wilderness would conform with the requirements in section 6.3.10.3 of *Management Policies 2006*: “Although the development of facilities to serve visitors will generally be avoided, campsites may be designated when essential for resource protection and preservation . . . [and] . . . may include a site marker, fire rings, tent sites, food storage devices, and toilets if these are determined by the superintendent to be the minimum facilities necessary for the health and safety of wilderness users or for the preservation of wilderness resources and values. Toilets will be placed only in locations where their presence and use will resolve health and sanitation problems or prevent serious resource impacts.”

59. **Comment:** The National Park Service must clearly show in all alternatives of the draft general management plan and environmental impact statement why backcountry zone designation “would protect these lands from incompatible development and inappropriate use.” (193 152 WI1020 S)

**Response:** As described on page 58 and 60, the backcountry zone would provide the same wilderness resource protection and visitor experience as the designated wilderness zone. None of the alternatives would allow any development in this zone, and all uses would have to be consistent with those specified in the Wilderness Act.

#### Alternatives - Trails

60. **Comment:** A trail connecting Carlsbad Caverns National Park, Guadalupe Mountains National Park, Lincoln National Forest, New Mexico state lands, and Bureau of Land Management lands should be considered. (332 121, 152 VU1000 S)

**Response:** Because the National Park Service does not have any authority for the management of lands outside the park boundary, such a trail would have to be accomplished through cooperation among the land managing agencies. Pages 26 through 28 describe the relationships among the National Park Service and other land management agencies. The National Park Service appreciates the suggestion and will consider cooperative action with the U.S. Forest Service, Bureau of Land Management, and state of New Mexico.

61. **Comment:** Address mitigation and elimination of social trails. (157 122 VU1001 S)

**Response:** Social trails, or informal trails created by visitors, are addressed in the draft general management plan on pages 52, 61, 120, 230, 234, 244, and 340. However, social trails are not a general

management plan issue. Regardless of which alternative is selected, the elimination and mitigation of social trails will continue to be managed in conformance with guidance in section 9 of *Management Policies 2006*, the *National Park Service Transportation Planning Guidebook* that supports Director’s Order 87A, and Director’s Order 42 on accessibility for visitors.

62. **Comment:** With regard to historic structures and landscapes, the National Park Service talks about preservation, stabilization, and rehabilitation of significant resources. How will the National Park Service ensure that historic structure activities adhere to the overarching Wilderness Act requirements and prohibitions? (258 121, 152 AL1121 S)

**Response:** National Park Service actions to manage cultural resources on lands that are both designated and eligible for wilderness would comply with the Wilderness Act and laws and regulations that direct the management of cultural resources in parks.

#### Alternatives – Exotic Species

63. **Comment:** A feral hog control program is needed. (82 122 AL1150 S)

**Response:** See the response to comment 30. Control of exotic species is being implemented in accordance with the park’s existing exotic species management plan.

64. **Comment:** There is no thorough discussion about how invasive plants or animals will be removed or killed in wilderness. (308 152 WI1030 S)

**Response:** Details regarding measures for removing invasive species from wilderness areas would be included in the park’s wilderness plan and invasive species management plan (see pages 58 and 125 in the draft general management plan), which would tier from the general management plan. All measures would be

consistent with the provisions of the Wilderness Act.

65. **Comment:** Feral hog control is needed since they now have been spotted just off Guadalupe Mountains National Park next to McKittrick Canyon. (116 122 WL1020 S)

**Response:** See the responses to comments 30 and 64.

66. **Comment:** The National Park Service must explain what "eradicating all species of exotic plants throughout the park," "more strict control measures," and "native plant revegetation" mean. How will wilderness character be protected with regard to management of exotic species? (218 152 AL1091 S)

**Response:** The environmental impact statement is written in plain language that the general public can understand, in accordance with Title 40, section 1502.8 of the *Code of Federal Regulations*, which presents the Council on Environmental Quality regulations for implementing the National Environmental Policy Act. The words and phrases in question are intended to be understandable using standard dictionary definitions, and are not technical terms that need further definition or clarification.

The general management plan is intended to provide broad direction for park management. Specifics regarding resource management techniques are beyond the scope of this general management plan.

Management of exotic species is addressed in accordance with Texas state law, federal law, and NPS policies. As referenced on page 10 of the draft general management plan and in section 4.4.4.2 of *Management Policies 2006*, all exotic plant and animal species that are not maintained to meet an identified park purpose would be managed, up to and including eradication, if control is prudent and feasible.

Exotic species would not be allowed to displace native species if displacement can be prevented. High priority would be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled (section 4.4.4 of *Management Policies 2006*).

As indicated on page 311 of the draft general management plan, programs to manage exotic species would be designed to avoid causing significant damage to native species, natural ecological communities, natural ecological processes, cultural resources, and human health and safety. In the backcountry and designated wilderness parts of the park, wilderness character would be protected by employing management approaches that were consistent with the Wilderness Act and with the wilderness protection policies in section 9 of *Management Policies 2006*, *Reference Manual RM 41: Wilderness Preservation and Management*, and the park's wilderness management plan.

67. **Comment:** What exotic plants specifically does the National Park Service want to eradicate? What are "more strict control measures"? What does "aggressive management action" mean? What native plants will be planted and where will they be planted? How will wilderness character be protected with regard to these proposed actions? (128 152 AL1031 S)

**Response:** Exotic plants currently being managed for control include salt-cedar, African rue, Malta starthistle, common horehound, Johnson grass, flannel mullein, Siberian elm, and Russian thistle. Additional species will be managed or controlled as is feasible.

68. **Comment:** On Page 74, "Management of Exotic Species," the National Park Service does not state how wilderness character

will be protected when exotic species are killed. (130 152 AL1061 S)

**Response:** See response to comment 66. Beyond this, priorities for managing exotic species in designated and eligible wilderness would be established under the same guidance as in other areas of the park. Additionally, in designated and eligible wilderness, management decisions affecting wilderness would be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative actions, projects, or programs that could affect wilderness character, resources, or the visitor experience are necessary, and, if so, how to minimize impacts. This would also be addressed in the *Backcountry/Wilderness Management Plan* update described on page 125.

69. **Comment:** On page 111, “Management of Human Disturbed Ecosystems” and “Management of Exotic Species,” what do “aggressive exotic plant control,” “eradicating target species of exotic plants throughout the park (which species are targeted),” and “aggressive monitoring and mitigation measures” mean? (306 152 AL1110 S)

**Response:** See response to comment 66.

70. **Comment:** Pages 131-138, “Features of the Alternatives,” the National Park Service must define “aggressive management” for exotic species, “Eradicate target invasive species” (what species), “more strict prevention measures,” “more aggressively protect water quality and quantity,” “stabilize and preserve,” “site restoration,” and other similar phrases. (328 152 MT1000 NS)

**Response:** See responses to comments 56 and 66.

71. **Comment:** On page 88, “Management of Human Disturbed Ecosystems,” what does “aggressive control of exotic plants” mean? (240 152 AL1031 S)

**Response:** See response to comment 66.

72. **Comment:** Pages 228- 229, “Plant Communities and Vegetation,” what does the National Park Service plan to do to control or reduce this exotic plant species growth? (148 152 AL1061 S)

**Response:** See response to comment 66.

## Alternatives – Monitoring, Indicators, and Standards

73. **Comment:** Pages 119-120, “Soils,” the National Park Service states “Monitor for visitor impacts.” What monitoring is this? What will be implemented? (167 152 AL1130 S)

**Response:** As noted on pages 56 through 61, the National Park Service has established desired resource conditions for each management zone. The selection of the preferred alternative will establish the geographic areas in which the desired conditions of each management zone will be achieved.

In subsequent planning that tiers from the general management plan, these desired conditions would serve as the basis for developing mechanisms, including the indicators, standards, and monitoring, that denote when visitor capacity is being approached or exceeded. The National Park Service would use the program of indicators and standards to determine if adverse effects on soils are approaching levels of concern. If they are, the National Park Service would select and implement the most appropriate actions from a wide range of available approaches, based on the specific conditions at each site, and would then monitor for effectiveness. Monitoring and implementation strategies will be addressed outside the general management plan.

74. **Comment:** Page 119, “Mitigative Measures,” the National Park Service does not tell what the “compliance monitoring program” is for mitigation measures. (169 152 AL1130 S)

**Response:** Compliance monitoring program elements would vary based on the resource being monitored. For example, compliance monitoring for the protection of soils would be very different from compliance monitoring that was performed to ensure the quality of visitor experiences. Compliance monitoring programs will be developed on a case-by-case basis during implementation planning. Monitoring programs would be consistent with the well-established and successful approaches based on indicators, standards, and management actions that have been implemented at units throughout the national park system. Indicators and standards would be an important component of compliance monitoring, as described on pages 56 through 61.

**Comment:** Visitor use of the park should be monitored to see how their use impacts such things as ecosystems, solitude, wilderness values, and other characteristics. (49 120 VU1110 S)

**Response:** This type of monitoring would be included in all of the alternatives, as described in pages 119 through 123.

75. **Comment:** The Texas Parks and Wildlife Department staff recommends project areas be surveyed for the presence of rare species before initiating any development projects that involve ground disturbances. (36 130 WL1010 S)

**Response:** As described on page 51, “Before the National Park Service would implement any disturbance under any of the alternatives; it would prepare a detailed development plan and would perform biological surveys. If individuals of [special status] species were detected, the plan would be revised to protect them through avoidance.”

76. **Comment:** The destruction of migratory bird nests with birds or eggs is prohibited as is the possession of said nests.

Therefore, the U.S. Fish and Wildlife Service recommends that breeding surveys, presence/absence surveys, and nest occupancy be conducted prior to construction during the breeding season. (41 131 WL1020 S)

**Response:** Such surveys would be included in the general “biological monitoring” category in the wildlife mitigation measures presented on page 121. The potential for impacts would be reduced by scheduling most construction during the winter, when both bird breeding and visitors occur in the lowest numbers. If construction would occur during the breeding season, the National Park Service would perform biological surveys to determine if there were nests in the affected area. Nests or eggs would be protected until after the young fledged. Additional mitigation measures could be identified during site-specific planning, which would include environmental compliance as necessary. Additional information is provided in section 4.4.1.1, “General Principles for Managing Biological Resources,” of *Management Policies 2006*.

77. **Comment:** All of the alternatives indicate the removal of the power line that runs through McKittrick Canyon. The draft general management plan and environmental impact statement does not indicate the length of the power line or if poles would also be removed. The U.S. Fish and Wildlife Service recommends that some utility poles be left in place. These poles would be used by raptors for roosting and feeding. We also recommend that raptor nesting platforms be placed on some of these poles. (43 131 WL1020 S)

**Response:** The power line is approximately 2.5 miles long. On page(s) 71, 85, 98, and 110 (all alternatives) of the draft plan, the proposal to remove the powerline in McKittrick Canyon will not be carried forward. Further



environmental compliance will be conducted should funding become available in the future. At that time, the NPS will analyze further the USFWS recommendation that the park should consider leaving powerline poles up for potential raptor roosting and feeding sites and locations for placing nesting platforms. However, at this time it is the position of the NPS that all components of the power line should be removed because they detract from the natural beauty of McKittrick Canyon and interrupt scenic vistas. Additionally, the National Park Service believes that conditions are too windy to provide nesting opportunities.

78. **Comment:** The park needs to develop a biodiversity list which should include all life forms. To really be able to manage the park with an eye on ecosystem health, it is necessary to know all the life forms we are dealing with. (80 120 WL1030 S)

**Response:** The National Park Service has a good understanding of how the plants, animals, and physical features of Guadalupe Mountains National Park interact on an ecosystem level. Inventorying all life forms would not add measurably to the ability of the National Park Service to manage the park in accordance with its mandate in the Organic Act.

#### Alternatives - Mitigation

79. **Comment:** Social trails should either be restored to native ecosystem or incorporated as part of the official trail system. (108 152 AC1000 S)

**Response:** See response to comment 61. The management of social trails is an ongoing management task that the National Park Service undertakes with existing management authorities. The approach to managing social trails depends on how they were created and where they are located. As described on page 120 in the draft general management plan, areas used by visitors would be

monitored to identify, among other indicators, the potential emergence of social trails. Also, as noted on page 61 in the description of the motorized scenic corridor zone, monitoring would occur for problems that typically occur along roads, including social trails. The results of monitoring could result in the implementation of a range of potential management actions.

80. **Comment:** Restoration of the metal roof and cistern storage system at the historic Bowl Cabin could provide a longer-lasting water source for turkey and other wildlife. (31 123 WL1030 S)

**Response:** The suggested action would not be permissible in wilderness under the wilderness preservation and management provisions in section 6 of *Management Policies 2006*.

#### Alternatives - Facilities

81. **Comment:** Hardened, covered interpretive exhibits, such as at the McKittrick contact station, should be developed for the Gypsum Dunes overlook parking area, as well as the Dog Canyon trailhead area, and Williams Ranch house. (316 123 CR1000 S)

**Response:** The details of specific development projects and designs would be determined during site-specific implementation planning. The zone prescriptions for the frontcountry and developed zones that would include these areas in the action alternatives would guide the appropriate level of development for facilities such as those that support interpretive exhibits.

82. **Comment:** What is the projected use for the proposed "hike-in" campground? How was this determined? (315 152 VU1041 S)

**Response:** As first described on page 84 in the draft general management plan, the intended use of this campground, which was a component of the preferred

alternative and alternative C, would be to provide an opportunity for people who want to backpack but cannot climb to the top of the mountain, such as visitors with physical challenges and families with small children. However, the trail to this campground would not be wheelchair accessible.

Depending on siting studies, the campground might be in the frontcountry, wilderness threshold, or backcountry zone. It is an appropriate facility for any of these zones.

Levels of use were estimated based on observations of use for the park's 10 existing backcountry campgrounds. The three to five campsites in the proposed hike-in campground below the eastern escarpment will be full on some days, particularly weekends and holidays in the spring, summer, and fall. They will have little or no use on other days, especially on weekdays during the winter.

Use of this facility would require a no-fee permit like all of the backcountry campgrounds (see pages 60 and 84). Therefore, although demand often might be high, use in the sense of "occupancy" should never exceed campground capacity.

83. **Comment:** Under the preferred alternative, remove most of the water tanks and pipelines left in the Bowl area with the possible exception of a small area for interpretive purposes. (83 137 PO1050 S)

**Response:** Removal of the tanks and pipelines is included under the alternative B. These facilities would be retained under the preferred alternative as part of the discovery sites for purposes of interpreting early ranching life. Many of these features have been determined by the Texas Historical Commission as eligible for listing on the national register as an example of the extensive water

distribution system required of early 20th Century ranches on the west Texas landscape.

84. **Comment:** The National Park Service, rather than concessioners, should operate campground facilities. Commercial services are not needed in the park, and private concession operations should be located outside the park. (195 121, 123, 146,152 CO1000 S)

**Response:** Commercial visitor services planning identifies the appropriate role of commercial operators in helping to provide opportunities for visitor use and enjoyment (*Management Policies 2006*). Whenever a unit of the national park system is considering the use of commercial visitor services, a commercial visitor services plan must be prepared. Under the preferred alternative and alternative C, a commercial services plan would be prepared to determine the types of commercial visitor services that would be necessary and appropriate in the park. The National Park Service must also determine what types and levels of commercial activities are permissible under applicable laws and regulations. At a minimum, all commercial activities must operate in a manner that is consistent with the mission of the park and should provide high-quality visitor experiences while protecting important natural, cultural, and scenic resources. The National Park Service would also have to determine if the operation was financially feasible. If the service would not be financially feasible, then the National Park Service could not provide that service through a commercial provider.

85. **Comment:** Recreational vehicle campgrounds: none at Pine Springs. These ought to be east of the highway as well. (300 121 VU1042 S)

**Response:** Under the preferred alternative and alternative C, the exact location of the proposed campground would be

determined during site-specific planning. As first described on page 83 of the draft general management plan, careful siting would be done to avoid sensitive resources, such as archeological sites and populations of special-status (such as endangered or threatened) species. Avoidance of areas prone to flash flooding also would be an important site selection criterion. Therefore, neither side of the highway was ruled out in the general management plan. Site-specific planning would include the preparation of any necessary environmental compliance.

### Alternatives - Park Operations

86. **Comment:** Interpretative staff levels should allow operations of the Frijole Ranch history museum on a 7-day-per-week basis. (238 112 CR1000 S)

**Response:** Staffing levels are determined through an administrative process designed to focus park staff and resources on operational priorities of the park as articulated in the current foundation statement in Chapter One while also maintaining operational flexibility and efficiency. Determination of staffing levels can be based on a variety of factors, including the level of visitor use and resource protection needs.

87. **Comment:** There is need for more money in the budget for various programs, including prescribed fire in wilderness and determining whether fire management will affect wilderness character. (104 122 PO1020 S)

**Response:** See the response to comment 86. Additionally, the budgets for these activities are developed through the fire management and wilderness management plans.

88. **Comment:** On page 102–103, “Costs,” we do not support the reduction of full-time employees from 40 to 34. We support the National Park Service hiring more full-time employees for law enforcement,

resource protection, and interpretation. (155 2, 44, 45, 50, 112, 117, 121, 127, 129, 138, 152 AL1080 S)

**Response:** See the response to comment 86.

89. **Comment:** The basis for proposed staff levels and employee recruitment ability for the alternatives should be provided to help understand the proposals. (276 152 PO1020 S)

**Response:** See the response to comment 86. Employee recruitment can be affected by factors such as the availability of housing, which would not be adequate at any staffing level, including current levels and those suggested by the commenter.

90. **Comment:** There is a contradiction in the general management plan and environmental impact statement about the replacement of full-time employees with seasonal employees and the expectation that seasonal staff will be able to conduct the duties of full-time maintenance employees. (289 152 PO1020 S)

**Response:** See the response to comment 86. The National Park Service believes that the use of seasonal positions increases staffing flexibility and that park operations become more efficient because hiring can be based on the needs and durations of specific projects.

91. **Comment:** Are staff and budget available to adequately operate, maintain, and protect the park as stated on pages 15 and 19 of the general management plan? Discuss priorities of resource protection if adequate staff and funds are unavailable. Full natural resource protection elements should occur first before any elements are implemented that deal with development or recreation, or that degrade the park’s natural environment. (295 152 PO1020 S)

**Response:** See the response to comment 86. Additionally, priorities for resource protection are described in the general management plan in the “Foundation for

Planning and Management” on pages 16 through 20. Pages 63 and 64 discuss how implementation will depend on future funding levels and servicewide priorities, and on partnership funds, time, and effort. Approval of the plan does not guarantee that funding and staff would be forthcoming, and priorities for the use of available funds would be determined to ensure fulfillment of park purpose and protection of the park’s fundamental resources and values.

92. **Comment:** More details are needed about the quantity and use of fees for projects since 2002. (296 152 PO1020 S)

**Response:** Page 205 discusses park fees as a component of the park budget and lists types of projects that have been completed with fee money. Projects supported by fee revenues have involved visitor interpretive and wayside exhibits, cultural resource preservation, accessibility for visitors with impaired mobility, visitor services, and maintenance.

### Alternatives - Definitions

93. **Comment:** What is the “landscape rehabilitation work” that is referred to on page 93? (140 152 AL1031 S)

**Response:** The cited costs are for the preferred alternative’s rehabilitation of cultural landscapes at Frijole Ranch, the Williams Ranch, and Ship-on-the-Desert, and preservation of the cultural landscape at the Pratt Cabin.

94. **Comment:** On page 124 for alternative B, the National Park Service should define restoration and state what the restoration plan would be. (160 152 AL1091 S)

**Response:** As stated in section 4.1.5 of *Management Policies 2006*, restoration involves activities to “return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated.” The restoration

plans cited on page 124 would specify details regarding the approaches that would be applied at each site.

95. **Comment:** Page 123, “Sustainable Design and Aesthetics,” why does the National Park Service require sustainable projects “whenever practicable” when it requires protection of cultural resources “to the greatest extent possible”? Why should sustainability be less important than the protection of cultural resources? (163 152 AL1130 S)

**Response:** It is not the intention of the National Park Service use the general management plan to prioritize between sustainable design and protection of park resources. The National Park Service would make implementation decisions in a manner that achieves the NPS mission in a cost-effective and environmentally responsible manner, ensuring value returned for every agency expenditure and action. The text in the general management plan reflects the specific laws and executive orders that direct these mitigation measures, such as the National Historic Preservation Act and Executive Order 13423—Strengthening Federal Environmental, Energy, and Transportation Management.

### Alternatives - Horses

96. **Comment:** In alternative B, perhaps the National Park Service could reduce, but not eliminate entirely, horse use (day use only) on trails in Guadalupe Mountains National Park. Reducing horse use by some percentage (perhaps 20%-50%) would reduce environmental impacts on geological, biological, and ecological resources and conflicts with hikers. (79 2, 45, 50, 121, 127, 138 AL1031 S)

**Response:** Horse use would continue to be allowed in the park under alternatives A and C and the preferred alternative. Current horse use levels are low in the park, and setting a management target to

reduce use may effectively eliminate it. The alternatives that provide for continued horse use in the park would manage it to minimize adverse impacts and maintain desired resource conditions. If monitoring demonstrated that horse use in a specific location was causing a deviation from desired conditions, then management practices would be employed to restore the desired conditions.

97. **Comment:** Pages 139-143, table 7, Summary of Impacts, alternative B, the National Park Service states “The elimination of the hammering action of horseshoes on fossil deposits in trails would have a long-term, beneficial impact.” Why is the National Park Service proposing in the preferred alternative to continue to allow the “hammering action of horseshoes” on fossil deposits at the present levels? (20 152 EC1000 S)

**Response:** Horse use occurs at very low levels and impacts to fossils are very limited. In the long term, the park would employ visitor use capacity methods, as described on page 56, to manage horse use to avoid unacceptable impacts.

98. **Comment:** There is a user conflict problem between horses and hikers, but the National Park Service does nothing and suggests nothing about how to resolve it. What does the National Park Service think about eliminating horse use? (144 152 EC1000 S)

**Response:** Elimination of public horse use in the park is evaluated in alternative B. Horse use occurs at very low levels and is not allowed on some trails. Therefore, the incidence of conflict is low. As discussed on page 267 of the draft general management plan and environmental impact statement, eliminating all horse use in the park would result in a major adverse impact on visitor experience and understanding, as there are relatively few places to ride on public land in the region, while proving a negligible or small beneficial effect for other park users.

99. **Comment:** The National Park Service does not separate out an analysis of the erosion caused by horses and hikers and compare them. How much less and where would the erosion and other environmental impacts be without horses? (277 152 EC1000 S)

**Response:** The impacts from multiple uses, including horses and hikers, are evaluated in the environmental impact statement, but it does not attempt to weigh the relative impacts of one use over another. Instead, it discloses the impacts of each alternative as a whole and their cumulative impacts. Within this context, the elimination of public horse use in alternative B provides a comparison with the other alternatives regarding effects with and without horse use.

All action alternatives call for the development and implementation of a visitor use capacity program that would manage the impacts of both horse users and hikers. The general management plan management zones prescribe desired conditions that the National Park Service strives to achieve. With a visitor use capacity program, future monitoring would evaluate conditions against established standards for resource condition and visitor experience. Whenever those standards were approached, the National Park Service would determine appropriate management actions and would implement them to maintain desired visitor experience and resource conditions.

100. **Comment:** “The elimination of developed camping and horseback riding would reduce the use of the park for these purposes.” What is the proportion each of these two uses currently as part of all recreation or visitation in Guadalupe Mountains National Park ? (330 152 EC1000 S)

**Response:** While the park does not maintain exact counts of horse use, the

number of visitors using developed campgrounds is much larger than the number of visitors riding horses.

#### Alternatives – Research Natural Areas

101. *Comment:* On pages 75, 89, 99-100, and 111, “Management of Research Natural Areas,” what other areas may be designated as research natural areas; where are they; how many acres are they, and what is the purpose of setting aside each one? (61 152 AL1031 S)

*Response:* The locations of research natural areas are not disclosed to the public and public use is restricted to protect their integrity for scientific research. New research natural areas would be selected from typical, preferably undisturbed, physical and biotic community types, and could span management zone boundaries. Research natural areas in national park units range from 100 acres to more than 10,000 acres.

#### Alternatives – Vehicles and Access

102. *Comment:* No through road in the park. The existing highway to the south provides an excellent way around. State, not park resources, should be used to maintain, improve, and develop those. (98 146 AC1000 S)

*Response:* In the draft general management plan, alternative C included a proposed road from Williams Ranch to the west boundary of the park. While development of the road would be consistent with the concept of the alternative, the road has been removed from alternative C in the final general management plan and environmental impact statement based on comments received and because it would be inconsistent with the findings of the wilderness eligibility assessment described in appendix D of the draft plan.

103. *Comment:* The outer edges of the park, Pratt Cabin, Williams Ranch, PX Well, the Dunes should be improved through actions such as providing public parking or road improvements for anyone without a 4-wheel-drive vehicle. Access to park areas should be formalized through/across private lands. (312 109, 123, 129 AC1000 S)

*Response:* The draft general management plan evaluated different levels of access to and parking in different parts of the park using various types of vehicles, depending on the goals and concept of each alternative. In all cases, the proposed vehicle access was consistent with the zoning applied in the alternative. Park features that were included in the access evaluations included road condition, trailheads, overlooks, historical sites, and other interpretive sites.

## ENVIRONMENTAL CONSEQUENCES

### Environmental Consequences - Development

104. *Comment:* Page x, preferred alternative and page xii alternative C, we do not consider the loss of 200 or 500 acres of natural habitat with functioning natural ecological processes a "minor" environmental impact. (210 152 EC1010 S)

*Response:* The impact intensity was classified as minor for the following reasons.

- None of the lands considered for development in these alternatives would be in a designated wilderness or backcountry zone, which were designed primarily to protect the park's high-value natural resources. All would occur in the frontcountry and developed zones, where these

actions would be consistent with those zones' intent.

- Much of the area proposed for disturbance is not “natural habitat with functioning natural ecological processes.” Most is in or adjacent to already disturbed areas that currently have low value for native vegetation and wildlife.
- Impact intensity thresholds for natural resources are defined on pages 219 through 222 of the draft general management plan. As explained throughout chapter 4 and summarized in table 7, application of these thresholds to the changes that would occur with the alternatives would not result in any major adverse impacts on the park's natural resources, and would have few moderate adverse impacts. Most impacts on natural resources would be beneficial, negligible, or minor adverse, leading to a collective impact intensity for lands in the park of minor adverse.
- Both values represent a very small part (0.2% and 0.6%, respectively) of the 86,416-acre park. The acreages are not for a contiguous block of land, but represent the summation of disturbances that would occur at six or seven locations, primarily close to the park's north, east, and west boundaries (see the maps on pages 81 and 105) plus along the road corridors providing access to those locations.
- The cited numbers represent reasonable worst-case values. With the application of mitigation such as that described on pages 119 through 122, actual losses could be lower.

105. **Comment:** Page 230, Why is the destruction of 1,000 acres of natural area or wilderness-quality area considered acceptable and why is this considered to

be a relatively small environmental impact? (221 152 EC1010 S)

**Response:** The comment misinterprets the text on this page, which describes continuation of the existing condition under alternative A. Currently, about 1% of the land in the park, primarily near the park boundaries at Pine Springs, Frijole Ranch, McKittrick Canyon, Ship-on-the-Desert, and Dog Canyon, supports development such as historical and other interpretive sites, campgrounds, roads, parking areas, and administrative facilities. None of these areas is located in designated or potential wilderness. This alternative would not include any additional development and, hence, the ongoing impact to wildlife would continue to be negligible to minor.

106. **Comment:** Page 284, “Unavoidable Adverse Impacts” and “Irreversible and Irretrievable Commitments of Resources,” the National Park Service remains totally quiet about what these “adverse impacts” are. The National Park Service has not analyzed what the National Environmental Policy Act says has to be in this section of the environmental impact statement. (222 152 EC1020 S)

**Response:** Adverse impacts from the alternatives are presented throughout chapter 4 and are summarized in table 7. The sections on unavoidable adverse impacts and on irreversible and irretrievable commitments of resources were rewritten.

Section 4.5.G.8 of *Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* provides guidance on addressing the sustainability and long-term management consideration of the National Environmental Policy Act. With regard to unavoidable adverse impacts, it states, “You should focus this section on “real” environmental issues, or those that would involve major impacts if action

were taken.” This requirement was summarized on page 284 for alternative C and in a similar location at the end of the impact analyses for the other alternatives.

A review of table 7 on pages 139 through 148 of the draft general management plan shows that major adverse impacts would occur only with alternative B. The “Unavoidable Adverse Impacts” section on page 270 of the draft general management plan clearly identifies these major adverse impacts.

107. **Comment:** Page 246, Preferred Alternative, Natural Resources, Soils, the National Park Service states “Actions of the preferred alternative would disturb about 100 acres of soil through the park.” This statement is incomplete. The 100 acres of disturbed soil, or plant communities and vegetation, etc., must be added to the 1,000 acres already disturbed to give a true picture of the total impacts that have and will be done due to this proposed alternative. (280 152 EC1020 S)

**Response:** The impact analysis for each alternative presents the direct and indirect effects caused by the alternative. As noted on page 218 of the draft general management plan, each of the action alternatives is compared to a baseline represented by Alternative A: No Action, which would continue current management. For that alternative, on pages 227 and 228, the National Park Service identifies “Developed areas in the park that are currently disturbing soils,” and “ongoing soil disturbance caused by the use of these facilities” and discloses impact intensities based on the threshold criteria on page 219. Building from this, the analyses for the action alternatives represent impacts from any *new* disturbance or restoration. This approach is consistent with the Council on Environmental Quality regulations for the National Environmental Policy Act

and the NPS National Environmental Policy Act procedures in Director’s Order 12 that tier from the Council on Environmental Quality regulations.

108. **Comment:** The National Park Service states, “Rather, user capacity is measured by comparing desired resource and visitor experience conditions to actual conditions and, when an imbalance is noted, employing management practices to return to the desired conditions.” This may be true in instances but for some resources there is no returning to the “desired conditions.” The loss of 200 or 500 acres due to construction of built environments means these areas would be permanently converted to developed park facilities” and would no longer qualify as wilderness. These are irreversible and irretrievable commitments of resources. (286 152 VU1010 S)

**Response:** The acres referenced in the comment are not in areas that are suitable for designation as wilderness. See the response to comment 104.

As the commenter notes, the National Park Service employs visitor use capacity, which is discussed on page 56, to identify and respond to concerns about resource conditions. However, it is *the general management plan* that defines, through management zoning, the desired condition for resources and visitor experiences in any particular area of the park. As such, “wilderness” would not be the desired condition for areas zoned as developed or frontcountry.

The actions that would occur because of the zoning established in the selected alternative would not necessarily result in an irreversible and irretrievable commitments of resources. Specifically, a future update of the general management plan could specify an alternative that would remove some or all of the structures in a developed area and



restore the site to a natural condition. This is precisely the approach that is included in alternative B of the draft general management plan for the tent camping area at Pine Springs, Manzanita Spring at Frijole Ranch, and the public horse corral and NPS' pack horse operation at Dog Canyon (see pages 97 and 98).

109. **Comment:** The loss of 200 or 500 acres due to construction of built environments means these areas "would be permanently converted to developed park facilities" and would no longer qualify as wilderness. These are irreversible and irretrievable commitments of resources. We do not consider the loss of 200 or 500 acres of natural habitat with functioning natural ecological processes as a "minor" environmental impact. (291 152 WI1020 S)

**Response:** See the responses to comments 104 and 108.

#### Environmental Consequences – Methodology

110. **Comment:** This draft general management plan and environmental impact statement, by using qualitative and un- or ill-defined words and phrases (negligible, minor, moderate, and major and the undefined phrases in their definitions), ensures that the public and decision-makers cannot compare alternatives because they cannot see how the National Park Service judged them. An all or mostly qualitative assessment, analysis, and evaluation of environmental impacts is not sufficient to deal with the clearly articulated Council on Environmental Quality National Environmental Policy Act implementing regulations, Section 1502.14. (252 152 EC1010 S)

**Response:** The environmental impact statement is written in plain language that the general public can understand, in

accordance with Title 40, section 1502.8 of the *Code of Federal Regulations*, which presents the Council on Environmental Quality regulations for implementing the National Environmental Policy Act. The words and phrases in question are intended to be understandable using standard dictionary definitions. These words and phrases are not technical terms that need further definition or clarification.

With regard to the qualitative meaning of the impact thresholds, pages 218 through 226 in the draft general management plan present the impact thresholds and durations for each of the impact topics that were analyzed. Because the thresholds establish impacts within a relative framework, rather than as absolute numbers, they typically are more useful to the decision-maker than quantitative values. The impact threshold definitions used in this general management plan are appropriate for a programmatic planning document, and are consistent with the NPS' approved National Environmental Policy Act guidance, presented in *Director's Order 12 and Handbook*, for implementing the Council on Environmental Quality regulations.

111. **Comment:** In addition, the phrase "best professional judgment" is not defined in the environmental impact statement.-The use of "best professional judgment" (page 218) is not a substitute when quantitative information is available to show what impacts are or could be. We oppose the use of "best professional judgment" in lieu of using existing or not exorbitantly costly acquired quantitative data. (265 152 EC1010 NS)

**Response:** As noted on page 218, best professional judgment was used in conjunction with "the review of existing literature and studies, information provided by experts in the National Park Service and other agencies, and

Guadalupe Mountains National Park staff.” The citation of sources throughout the document demonstrates the solid technical foundation on which judgments were based. The qualitative approach used by NPS experts to describe most impacts analyzed in the environmental impact statement is a valid approach accepted by the Council on Environmental Quality for compliance with the National Environmental Policy Act when a quantitative approach is not reasonable, feasible, or necessary.

112. **Comment:** We are unable to find the complete analysis, assessment, and evaluation of “unacceptable impacts,” except for a brief description on pages 216-217 of the environmental impact statement. The National Park Service states “The impact threshold at which impairment occurs is not always readily apparent. Therefore, the National Park Service manages to avoid impacts that fall short of impairment, but are still not acceptable” and then lists some qualitative and non-specific criteria for unacceptable impacts. For example, “impede the attainment of the park’s desired future conditions,” “unreasonably interfere with,” “create an unsafe or unhealthful environment,” and “diminish opportunities for current or future generations.” What do these words and phrases mean? (270 152 EC1010 S)

**Response:**

Also, see new information in Chapter 4 of this document, “Changes from Draft to Final.” The discussion of impairment and unacceptable impacts has been removed from this Final GMP/EIS. The quoted text from page 216–217 of the draft plan is incomplete. The complete text refers the reader to the detailed explanation of unacceptable impacts in section 1.4.7.1 of *Management Policies 2006*, and then provides a summary stating that to protect

resources, “the National Park Service applies a standard that offers greater assurance that impairment will not occur. The National Park Service does this by avoiding impacts that it determines to be unacceptable. *These are impacts that fall short of impairment, but are still not acceptable within a particular park’s environment*” (emphasis added).

In the context of Guadalupe National Park, none of the alternatives considered in the general management plan would result in impacts that, individually or cumulatively, would:

- Be inconsistent with the park’s purpose and values.
- Impede the attainment of the park’s desired future conditions as identified in this general management plan.
- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values.
- Unreasonably interfere with park programs or activities, or an appropriate use, or the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural or historic locations within the park.

These criteria are found in section 1.4.7.1 of *Management Policies 2006*. Based on these criteria, no unacceptable impacts would occur as a result of implementing the actions proposed in the draft alternatives in this general management plan. In providing guidance on how to apply these criteria, section 1.4.7 of *Management Policies 2006* expressly states, “In making a determination of whether there would be an impairment, an NPS decision-maker must use his or her professional judgment. The same application of professional judgment

applies when reaching conclusions about “unacceptable impacts.” The response to comment 111 already addressed the Council on Environmental Quality’s acceptance of the use of professional judgment in National Environmental Policy Act evaluations.

The procedures for how and where the National Park Service addresses impairment has changed since the printing of the 2008 draft plan. New guidance directs that impairment (now called a “non-impairment finding”) be located only in an appendix in the decision document only (a “Record of Decision”) and are no longer addressed in EAs and EISs. Thus, the discussion of impairment (and related discussion of unacceptable impacts) has been removed from this document.

113. **Comment:** Throughout the document we requested that the National Park Service clarify and detail clearly the comparative differences between each alternative and define clearly what the words or phrases used mean. This included comments that the threshold definitions are inadequately defined. Seventy-three comments requested clarification of phrases such as “very small increment,” “generally adverse impacts,” “minimally increased demand,” “substantial alterations,” and “would affect a large area.” (279 152 EC1010)

**Response:** See response to comment 110.

114. **Comment:** On page 148, alternative B, the National Park Service has shown no documentation that there would be “increased demand for commercial camping and other overnight lodging.” So how does the National Park Service come up with “moderate, long-term, adverse impacts” on maintenance? (285 152 EC1010 S)

**Response:** Page 148 is a summary table. Increased demand for commercial

camping and other overnight lodging relates to the “socioeconomic environment” impact topic, while impacts on maintenance requirements are considered under “park operations.” The supporting analyzes for these tabular summaries are on pages 268 and 269, respectively.

Alternative B would eliminate camping at all but backcountry sites in the park. The analysis on page 269 explains that this would result in few if any reductions in maintenance because the facilities that formerly had been used for camping would continue to be used by day-use visitors. As stated on page 269, the moderate adverse impacts on park operations, facilities, and equipment would derive primarily from ongoing operational issues, such as lack of administrative space and offices in buildings that were designed as maintenance structures.

## Environmental Consequences – Definitions

115. **Comment:** On page 123, “Noise Abatement,” the National Park Service states “minimize objectionable noise, and exploring opportunity to reduce the sounds of human caused noise”. How will this be done? What is “objectionable noise”? The public and decision-makers need this information so they can review, comment on, and understand alternative C. (223 152 AL1091 S)

**Response:** The comment contains an incomplete quote. The full sentence is as follows, with the omitted text in italics: “*Specific actions could include, but would not be limited to siting and designing facilities to minimize objectionable noise, and exploring opportunities to reduce the sounds of human-caused noise.*” Examples were provided in the paragraph immediately preceding the quote, which said, “Standard noise abatement measures could include a schedule that minimizes impacts on

adjacent noise-sensitive uses, the use of the best available noise control techniques wherever feasible, the use of hydraulically or electrically powered impact tools when feasible, and the location of stationary noise sources as far from sensitive uses as possible.” Specific noise abatement implementation strategies would be determined during site-specific planning.

“Objectionable” noise depends on the perception of the individual. Natural sounds such as wind, bird calls, and flowing water are generally thought of as pleasant, particularly in the context of a national park. Similarly, sounds perceived as not being natural may be objectionable to some visitors.

116. *Comment:* On page 101, “Visitor Education, Interpretation, and Orientation,” the National Park Service uses the phrase “enhanced resource restoration.” What does this mean and how will it be implemented? (242 152 AL1091 S)

*Response:* The concept of alternative B would be to place a greater emphasis on promoting wilderness values and restoring natural ecosystem processes. Some of the examples of enhanced resource restoration that were provided on page 99 included enhancing conditions for native plant revegetation by creating an active planting program using locally collected seed, allowing Manzanita Spring to return to a more natural wetland (deleted from this final), and more aggressively pursuing the eradication of all species of exotic plants throughout the park.

117. *Comment:* On pages 126–127, “Environmentally Preferred Alternative” and table 5, alternative B has been low-balled by the National Park Service since it met criteria 3 and 5 yet the National Park Service says it does not. What does “the widest range of beneficial uses of the

environment” mean? What does “achieving a balance between population and resource use” mean? (243 152 AL1140 S)

*Response:* The National Park Service believes that the preferred alternative best meets the criteria established by Section 101 of the National Environmental Policy Act. Specifically for criterion 3, alternative B reduces the range of beneficial uses for many visitors because there is no camping except in the backcountry, and no horseback riding. For criterion 5, there are fewer opportunities for many visitors to experience the park except through the visitor center exhibits, resulting in less balance between population and resource use. The discussion on the environmentally preferred alternative has been expanded to include this information.

118. *Comment:* In “The Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity,” what does “sustainable action” mean? (284 152 EC1010 NS)

*Response:* As first presented on page 244, a sustainable action would not change the use of Guadalupe Mountains National Park or affect the long-term productivity of lands affected by its operation for future generations. According to the NPS Guiding Principles of Sustainable Design, sustainable practices maintain biological diversity and environmental integrity, contribute to the health of air, water, and soils, incorporate design and construction that reflect bioregional conditions, and reduce the impacts of human use.

#### *Environmental Consequences - Facilities*

119. *Comment:* The preferred alternative in the draft general management plan calls for the improvement over time of staging

and access for the Salt Dunes area. Plans call for the relocation of a parking lot and the addition of scenic overlooks and interpretive waysides – all in the name of promoting increased day use and better public understanding of the resource. While we recognize the virtue behind such ideas, it remains our concern that increased day-use, in this one area of the park, would have the potential to unduly jeopardize the well-being of sensitive natural resources and infringe upon the cultural and religious traditions of First Nations people. (99 109 CR1010 S)

**Response:** In some alternatives, opportunities to provide appropriate day use and interpretation at some sites may result in adverse impacts on natural resources and cultural resources. These impacts are disclosed in the draft environmental impact statement on pages 253, 259, 260, 261, 262, 263, 272, and 275. Based on the proposed level of development in the Salt Basin Dunes, impacts on American Indians observing sacred rituals or seeking solitude to practice traditional beliefs would be moderate, adverse, and long-term. The National Park Service will continue to work with American Indian tribes and others to minimize impacts from development near the Salt Basin Dunes. In addition, prior to any development in this area, the National Park Service would prepare a development concept plan and associated environmental compliance. All interested parties would be encouraged to participate in this process.

120. **Comment:** Considerable research was completed in Big Bend National Park that proved how detrimental horse use was in high country prior to the necessary changes. That data would surely be available. (46 132 EC1000 S)

**Response:** The research referred to by the commenter evaluated parking lots and horse trailers and not horse use in

general. Adverse and beneficial impacts on park resources and visitor experiences that would result from the alternatives' different levels of horse use are described in the environmental impact statement.

121. **Comment:** Page 262, Geologic Resources, Cumulative Effects, there should be less cumulative effects on geologic resources because horse use will be less in alternative B than the preferred alternative. How much less degradation will occur to geological resources with alternative B? (174 152 EC1000 S)

**Response:** Horse use would not affect park geology under any of the alternatives. Therefore, it would not contribute to geologic cumulative effects. Eliminating horse use would have a long-term beneficial impact on *paleontological* resources because the hammering action of horseshoes on fossils along trails would be eliminated. The contribution to cumulative impact would be negligible because of the limited exposure of fossil-bearing rocks in trails and the low levels of horse use.

122. **Comment:** The environmental impact statement should thoroughly consider impacts from horses, including the spread of exotics, manure smell, non-point water pollution, flies, and the costs of maintaining trails suitable for horses. (204 120, 122, 123, 152 EC1000 S)

**Response:** Adverse and beneficial impacts on park resources and visitor experiences that would result from the alternatives' different levels of horse use are evaluated in relevant impact topics on pages 227, 234, 249, 260, 262, 267, 268, 270, 273, 276, 280, and 281.

123. **Comment:** Cultural landscapes, the National Park Service states "in accordance with standards and guidelines." The National Park Service must explain what these "standards and guidelines" are. (176 152 EC1010 S)

**Response:** This excerpt from page 237 of the draft general management plan is followed by the text citation to the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. These standards are referenced throughout the document as the Secretary of the Interior (1995b).

124. **Comment:** On page 71, the National Park Service states, "Currently, all cultural interpretive exhibits are housed at a location separate from the visitor center." The National Park Service biases the description of alternative A when it says "This limits the ability of visitors to see the cultural exhibits." This text should be found only in chapter 4. (177 152 EC1010 S)

**Response:** This is an objective description of the existing condition. "Chapter 4: Environmental Consequences" does not attribute any impacts to this condition, but uses it only as a basis of comparison to determine the effects of the other alternatives on visitor use and understanding.

125. **Comment:** On page 144, alternative B, removal of cultural structures so they can be protected is a positive and not adverse effect.

**Response:** According to the Secretary's standards, the removal of cultural resources from their original location is less preferable than an onsite means of management such as stabilization, rehabilitation, or restoration. Page 264 of the draft general management plan discusses how actions to stabilize or rehabilitate other structures would result in no adverse impact. The methods for determining adverse impacts on cultural resources are described on page 222. (180 152 EC1010 S)

126. **Comment:** On page 145, allowing Manzanita Spring to fill naturally is not

an adverse impact on the cultural landscape because it is what the settlers found when they first arrived. (181 152 EC1010 S)

**Response:** The *pond* that is maintained by infrequent (once in several decades) dredging is specifically included as a component of the cultural landscape in the National Register of Historic Places listing for the Frijole Ranch house and cultural landscape. An adverse impact is concluded because the period of significance for the cultural landscape is that period of ranch activity after the pond had been created by modifying the spring.

Since the printing of the draft plan, a cultural landscape report for Frijole Ranch was completed. The human-modified spring was found to be a historically significant component of the Frijole Ranch landscape. Consequently, that study has been deleted from the plan. See "Alternatives or Actions Considered but Dismissed from Detailed Evaluation" for discussion about the resulting dismissal of returning the Manzanita Spring to pre-ranching conditions based on the study results.

127. **Comment:** Page 265, "Cultural Landscapes," the National Park Service states that if the human-made pond at Manzanita Spring is allowed to become a natural wetland it "would have an adverse impact on the Frijole Ranch cultural landscape." Which is more important in Guadalupe Mountains National Park, protection and restoration of the natural landscape or the human one? (183 152 EC1010 S)

**Response:** See response to comment 126.

Based on law and NPS policy, the National Park Service manages both natural and cultural resources. The action alternatives included in the draft plan two management approaches for

Manzanita Spring, including maintaining the human-made pond through dredging (in the preferred alternative and alternative C) and allowing it to fill in naturally with silt and return to a wetland (in alternative B). As a result, the impacts of each approach have been disclosed to decision-makers and the public.

As noted on page 184, cultural landscapes are geographic areas with both natural and cultural components that the National Park Service manages as cultural resources for their historical significance. Manzanita Springs is a contributing feature of the cultural landscape of Frijole Ranch. In alternative B, allowing the pond to fill in with silt would be an adverse impact on the cultural landscape.

128. **Comment:** Page 281, “Activities and Destinations,” we do not support making the Pratt Cabin a cultural landscape and operating it as “a visitor gateway.” Such actions will cause more damage to soil, plant communities and vegetation, wildlife, and other natural resources. (184 152 EC1020 S)

**Response:** The cultural landscape around Pratt Cabin is included in its National Register of Historic Places designation. Alternative C would rehabilitate the existing cultural landscape, not “make” a new one. The landscape would be managed to conform with the period of significance. Impacts on soil, plant communities and vegetation, wildlife, and other natural resources were evaluated under these impact topics.

129. **Comment:** Page 276, “Paleontological Resources,” we agree with the National Park Service, but the National Park Service does not say if this beneficial impact will reduce the damage to acceptable levels. (186 152 EC1020 S)

**Response:** Impacts are not additive and an adverse impact is not offset by a beneficial impact. Therefore,

comparisons to such levels are not possible.

130. **Comment:** Page 261, “Wildlife,” the National Park Service must document its assertion that “The locations of the restored areas adjacent to developed, intensely used areas would lessen their desirability for species that do not typically habituate to human use.” Huge positive impacts which are essentially ignored. (189 152 EC1020 S)

**Response:** The subject text will be replaced in the final document with the following:

*As described above, native vegetation (wildlife habitat) would be restored on about 100 acres of the park from which facilities had been removed. Because all of the restored areas would be adjacent to developed, intensely used areas, it would lessen their desirability and would be of low value for species other than those that habituate to human use. Moreover, the 100 acres would not be contiguous, but would provide fragmented habitat in multiple locations. Therefore, the resulting long-term, beneficial impacts on wildlife primarily would be for smaller species and adaptable, larger animals such as deer and coyotes.*

131. **Comment:** Page 248, “Wildlife,” the National Park Service states “During construction, some smaller animals might be killed or forced to relocate to areas ... If the habitat is at carrying capacity, then animals that leave the site will compete with other animals off their home range. (190 152 EC1020 S)

**Response:** This assessment is correct, and the resultant competition and associated effects contribute to the “short-term, minor, adverse effect” that is cited for construction during implementation of this alternative. During site-specific planning and design, more detailed assessments of the impacts would be

conducted and impacts would be mitigated to the extent possible.

132. **Comment:** Page 257, “Management and Administration,” how will “Enlarging the water storage system and providing a fire building at Dog Canyon “enhance the NPS’ ability to protect resources in the northern part of the park? (191 152 EC1020 S)

**Response:** Over the past two decades, fire management in national parks has evolved from routine suppression to an approach that acknowledges and employs fire as an important ecological component. In parks like Guadalupe Mountains National Park that have substantial areas of native vegetation, the goal is to employ fire on a natural-return-period cycle to maintain the health of the park’s natural resources. However, because the National Park Service does not have adequate fire management resources in the north part of the park, including a reliable water supply, it cannot reasonably expect to prevent most fires from crossing the park boundary. As a result, most ignitions currently must be suppressed, and the use of prescribed burns that would help control subsequent wildfires from natural or unintended human ignitions is limited. The water and equipment storage that would be included in the action alternatives would enable the National Park Service to implement better fire management practices and to move the park’s natural resources toward a more natural fire regime.

133. **Comment:** Page 214, “Water Exports,” how is the National Park Service going to address protecting aquifers in the Guadalupe Mountains National Park area? (199 152 EC1020 S)

**Response:** As described on page 28, the National Park Service would continue working with the Texas Water Development Board, Far West Texas

Regional Water Planning Group, Culberson County Groundwater Conservation District, Hudspeth County Underground Water Conservation District 1, and surrounding landowners to minimize or avoid impacts on park resources from groundwater extraction. All of the action alternative include a groundwater monitoring program on the west side of the park to document current water table levels and detect declines. If changes are detected, the National Park Service could implement any or all of the measures identified on page 320 of the draft general management plan to protect the park’s groundwater resources.

134. **Comment:** Pages 214-215, “Aircraft Overflights,” what will the National Park Service do to reduce aircraft over-flight noise? (200 152 EC1020 S)

**Response:** Aircraft flights are managed by the Federal Aviation Administration. The National Park Service would continue to work with this agency to minimize the adverse effects associated with aircraft overflights.

135. **Comment:** Page 215, “Lincoln National Forest, New Mexico,” what logging, road building, mineral extraction, and prescribed burning does Lincoln National Forest do in the greater Guadalupe Mountains ecosystem? (201 152 EC1020 S)

**Response:** Evaluation of specific actions in the Lincoln National Forest are beyond the scope of the general management plan. The cumulative impact analyses for each natural resource impact topic considered the effects of these types of activities that are occurring on public and private lands throughout the region. The cumulative analysis was conducted on each natural resource topic for all alternatives.



136. **Comment:** Page 227, Alternative A: No Action, Soils - What does "maintained surface" mean? Why does the National Park Service ignore horses since they cause more soil and vegetation damage? (202 152 EC1020 S)

**Response:** "Maintained surfaces" are defined in the remainder of the same sentence, shown below with the definition in added italics. "Trails are constructed to minimize impacts on soils by concentrating hikers on a maintained surface, *with water and erosion control measures to mitigate impacts.*" Pages throughout "Chapter 4: Environmental Consequences" that evaluated impacts from horse use are listed in the response to comment 122.

137. **Comment:** Resource protection should be prioritized higher than any other goal and this goal should be explained in more detail. (230 152 MT1000 S)

**Response:** The Organic Act requires the National Park Service to manage parks to "conserve the scenery and the natural and historic objects and the wild life therein." However, it also directs the National Park Service "to provide for the enjoyment of the same," so long as the manner and means of visitor use "will leave them unimpaired for the enjoyment of future generations." All of the action alternatives effectively balance protection of resources with visitor use, and none would result in any impairment of resources or any unacceptable impacts on natural resources.

As described in the response to comment 108, it is *the general management plan* that defines, through management zoning, the desired condition for resources and visitor experiences in any particular area of the park. Each alternative's goals for balancing resource protection with visitor use, within the constraints of the Organic Act, are summarized in its concept and supported by the elements in the detailed descriptions of each

alternative in chapter 2 of the draft general management plan.

The alternatives are supported by additional descriptions in the general management plan of desired conditions that are to be achieved parkwide, or within specific management zones. These are included on pages 10 through 14, 18 through 19, 56 through 61, and 307 through 334. These are supported by Management Policies 2006, numerous director's orders, and supporting reference manuals, all of which are available on the Internet at [www.nps.gov](http://www.nps.gov).

138. **Comment:** Proposals for water mining on the northwest edge of the park should be resisted because of the potential for surface salt creation, wind transport, and deposition. (44 120 PN1010 S)

**Response:** See the response to comment 135.

139. **Comment:** The National Park Service states "Average length of stay in the facilities would likely increase" but does not say what it would increase to and what it is now. (310 152 VU1120 S)

**Response:** As described on page 242, about 90 percent of the visits to the park are day trips, with most visitation concentrated at or near the visitor center and other developed activity areas along the U.S. Highway 62/180 corridor. Day visitors who live within a couple-hour drive from the park (for example, in El Paso, Texas or Juarez, Mexico) typically spend a full day in the park. Some visitors from outside the region camp overnight (if a campsite is available), but most spend a half-day or less in the Pine Springs and/or Frijole Ranch areas before departing for other destinations.

The change in the average length of visits has not been quantified. However, action alternatives that increased in the number of campsites probably would increase the number of people staying overnight in the park and, therefore, the average

duration of a visit. Eliminating camping except in the wilderness (alternative B) would have the opposite effect. Improved facilities at Pine Springs and Frijole Ranch may increase the visit duration for many visitors for whom the park is not a primary destination. The length of stay for day visitors from the region probably would not change, but the preferred alternative and alternative C may prompt them to visit the park more often.

### Environmental Consequences – Impairment

Note: NPS procedures now require the discussion of impairment to be located in the Record of Decision which is issued 30 days after the Final General Management Plan/Environmental Impact Statement is issued; therefore, it has been removed from this Final GMP/EIS. Please refer to Chapter 4 of this document, “Changes from Draft to Final” for more information. However, the NPS received several comments from the public about the impairment analysis in the Draft GMP/EIS. Those comments and NPS responses have been retained below for information and clarification.

140. **Comment:** Page xi, if alternative B really has a major adverse impact on visitor use and experience from eliminating camping except in the backcountry and a moderate to major adverse impact on management and administration due to insufficient space, then why does this not constitute an impairment? (298 152 EC1010 S)

**Response:** The “park resources and values” that are subject to the no-impairment standard are defined in section 1.4.6 of *Management Policies 2006*. Based on the Organic Act, these include:

*the park’s scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain*

*them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals.*

Impairment determinations are not made in the socioeconomic, visitor use and experience, and park operations sections of the document, because these topics are not considered park resources or values. These topics are only analyzed relative to impairment if the impact is resource-based.

141. **Comment:** This environmental impact statement should be an attempt by the National Park Service to implement the recent court ruling in favor of the Sierra Club and against the National Park Service about assessment of impacts and the methodology used, from impairment and National Environmental Policy Act perspectives, which was deemed inadequate, arbitrary, and capricious by United States District Judge John D. Bates. (175 152 EC1010 S)

**Response:** The referenced case dealt with an environmental assessment for an *implementation plan*, which is at a substantially more detailed level of planning. The level of impact defined in the general management plan and environmental impact statement is appropriate in this programmatic context. Site-specific analysis and compliance would be completed as appropriate during implementation of the general management plan.

142. **Comment:** Alternative A does not necessarily meet all of the goals and objectives that are critical if the National Park Service is to consider the general management plan successful. How does not meeting "park management goals" equate with "impairment" in Guadalupe Mountains National Park? (245 152 PN1000 S)

**Response:** While non-achievement of park goals would render it more likely that impairment could occur, non-achievement of park goals does not equate to impairment. Impairment of park resources is evaluated using the criteria presented on page 216. If the effects of alternative A met these criteria, then the conclusion of impairment would be presented in the environmental consequences section.

While alternative A may not fully meet all park goals, no impairment would result from the continuation of current management because no significant impacts would occur to resources or values whose conservation is "necessary to fulfill specific purposes . . . key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified in the park's general management plan or other relevant NPS planning document as being of significance." (section 1.4.5 of *Management Policies 2006*).

143. **Comment:** We support and urge the National Park Service to be proactive and not wait until unacceptable visitor use occurs and damage is done before setting capacity limits. The National Park Service should be proactive for the protection of all Guadalupe Mountains National Park resources. (322 152 VU1110 S)

**Response:** The National Park Service' approach of monitoring to provide early identification of concerns and to implement management actions well before conditions become unacceptable is cited throughout chapters 1 and 2 of

the general management plan. The most extensive descriptions of the use of this technique are included on pages 10 through 14, 56 through 61, 119 through 121, and 307 through 334 of the draft general management plan, but its application is included in many other locations.

The discussion of impairment (and related discussion of unacceptable impacts) has been removed from this document. The impairment discussion will be located in the Record of Decision.

#### Environmental Consequences – Trails

144. **Comment:** Description of the informal trail network is needed to assess their cumulative impacts. (297 152 PO1040 S)

**Response:** "Informal trails" are referenced on page 244, with regard to unauthorized access from development outside the park and do not represent a "network." When it becomes aware of their existence, the National Park Service works with other parties to close such trails, so their contribution to cumulative impacts is negligible.

145. **Comment:** We oppose adding 37 miles of additional trails in the "park's interior" as well as adding other primitive trails to the park's inventory. If the National Park Service cannot quantify the impacts, then it must use Section 1502.22 of the Council on Environmental Quality's implementing regulations for the National Environmental Policy Act to discuss this. (305 152 VU1001 S)

**Response:** See the response to comment 18. The trails are the traces of former ranch roads, and improvements would be limited to cairns to mark trail routes in difficult-to-follow areas and, possibly, signs at junctions with other trails. Therefore, adding them to the park inventory would largely involve printing them on the park map.

Consistent with the programmatic nature of the document, the environmental impact statement evaluated the impacts of adding trails to the park's inventory for all three action alternatives. Prior to adding any trails to the park inventory, more site-specific impact analysis would be done in the context of the backcountry management or trails plan, both of which are identified on page 125.

146. **Comment:** On pages 114-115, "Hiking Trails, Trailheads, and Horse Use," we are concerned that the National Park Service does not state what the environmental impacts will be of each of the proposed trails; what are the impacts on wilderness character. (101 152 EC1010 S)

**Response:** The referenced pages are in chapter 2, which details the proposed actions associated with each alternative. Impacts from the proposed action of adding trails in the wilderness area to the park's inventory are discussed in chapter

4 of the document for all three action alternatives.

The level of detail provided is consistent with the level of detail in a general management plan. See the response to comment 145.

Section 6.3.10.2 of *Management Policies 2006* states that "Where abandoned roads have been included within wilderness, they may be used as trails." Wilderness character would be maintained by following the procedures in section 6.3.10.2.

147. **Comment:** How would the National Park Service improve trails in a manner that would minimize impacts to wetlands, soils, and vegetation? (165 152 AL1130 S)

**Response:** This would be accomplished through applying the mitigative measures listed on pages 119 through 123 of the draft general management plan.



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
New Mexico Ecological Services Field Office  
2105 Osuna NE  
Albuquerque, New Mexico 87113  
Phone: (505) 346-2525 Fax: (505) 346-2542

April 25, 2008

Cons. # 22420-2008-FA-0032

Mr. John V. Lujan  
Guadalupe Mountains National Park  
400 Pine Springs Canyon  
Salt Flats, Texas 79847-9400

Dear Mr. Lujan:

Thank you for the opportunity for comment on the Draft General Management Plan/Environmental Impact Statement (DGMP/EIS) for the Guadalupe Mountains National Park. The DGMP/EIS analyzes four alternatives:

- Alternative A: The No-Action Alternative. This alternative represents the continuation of current management approaches and provides a basis for comparison with the other alternatives.
- Preferred Alternative: This alternative would emphasize wilderness values and restraint of ecosystem processes while also expanding some opportunities for visitors to enjoy easier access to park settings than currently exist. Construct a New Access Point 2 Miles of the Existing Commercial Vehicle Gate.
- Alternative B: This alternative would emphasize the promotion of wilderness values and restoration of natural ecosystem processes while providing improved visitor experiences in existing developed settings.
- Alternative C: This alternative would expand opportunities for visitors to enjoy easier access to a range of park settings and disperse park facilities more widely throughout the park.

The following comments are based on the DGM/EIS provided to us on April 15, 2008.

All of the alternatives indicate the removal of the power line that runs through McKittrick Canyon. The DGM/EIS does not indicate the length of the power line or if poles would also be removed. The Service recommends that some utility poles be left in place. These poles would be used by raptors for roosting and feeding. We also recommend that raptor nesting platforms be placed on some of these poles.

Construction during the migratory bird breeding season (March 15 – September 15) should be avoided where possible. The destruction of migratory bird nests with birds or eggs is prohibited as is the possession of said nests. Therefore, the U.S. Fish and Wildlife Service recommends that

Mr. John V. Lujan

2

presence/absence surveys and nest occupancy be conducted prior to construction during the breeding season. Because owls breed earlier, surveys for owls may start as early as February.

Thank you for the opportunity to review and comment on the DMP/EIS. In future communications regarding this project please refer to Consultation #22420-2008-FA-0032. If you have any questions, please contact Santiago Gonzales of my staff at the letterhead address or at (505) 761-4720.

Sincerely,

A handwritten signature in black ink, appearing to read "Wally Murphy", with a stylized flourish extending from the end.

Wally Murphy  
Acting New Mexico State Administrator

cc:

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico  
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry  
Division, Santa Fe, New Mexico



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6  
1445 ROSS AVENUE, SUITE 1200  
DALLAS, TX 75202-2733

JUN 09 2008

John V. Lujan  
Superintendent  
Guadalupe Mountains National Park  
400 Pine Canyon Road  
Salt Flat, TX 79847

Dear Mr. Lujan:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA, the U.S. Environmental Protection Agency (EPA) Region 6 office in Dallas, Texas, has completed its review of the Draft Environmental Impact Statement (DEIS) for the proposed Draft General Management Plan for the Guadalupe Mountains National Park. The preferred plan would emphasize wilderness values and the restoration of ecosystem processes while also expanding some opportunities for visitors to enjoy easier access to park settings than currently exist. This plan would not result in unacceptable impacts or impairment of park resources or values.

EPA rates the DEIS as "**LO**," i.e., EPA has "**Lack of Objections**" to the proposed action as described in the DEIS. Our classification will be published in the Federal Register according to our responsibility under Section 309 of the Clean Air Act to inform the public of our views on proposed Federal actions. If you have any questions, please contact Michael Jansky of my staff at 214-665-7451 or by e-mail at [jansky.michael@epa.gov](mailto:jansky.michael@epa.gov).

EPA appreciates the opportunity to review the DEIS. Please send our office two copies of the FEIS when it is sent to the Office of Federal Activities, EPA (Mail Code 2252A), Ariel Rios Building, 1200 Pennsylvania Ave, N.W., Washington, D.C. 20460.

Sincerely yours,

A handwritten signature in cursive script, reading "Cathy Gilmore", is written over a horizontal line.

Cathy Gilmore, Chief  
Office of Planning and  
Coordination (6EN-XP)





Life's better outside.™

June 16, 2008

John V. Lujan  
Superintendent  
Guadalupe Mountains National Park  
400 Pine Springs Canyon  
Sal Flats, TX 79847-9400

RE: Guadalupe Mountains National Park Draft General Management Plan,  
Culberson County, Texas

Dear Mr. Lujan:

Texas Parks and Wildlife Department (TPWD) recently received the Draft General Management Plan/Environmental Impact Statement for Guadalupe Mountains National Park. The management plan is being developed to guide the management of the park during the next 15 to 20 years. Four alternatives, including the "no-action" alternative, have been developed, evaluated, and presented in the draft plan. TPWD staff reviewed the draft plan and offers comments regarding the following:

- Selection of preferred alternative
- Rare species

Selection of preferred alternative

TPWD concur with the alternative identified as the preferred alternative. While it would result in more development than other alternatives (*e.g.*, Alternative B), it best fulfills the Park's mission of preserving natural resources while also providing additional access and educational opportunities to the public. It also addresses the changing demographic of park users and meets those needs.

Rare species

New development would primarily occur in areas already developed. However, information in the Texas Natural Diversity Database (TXNDD) indicates that numerous rare species, primarily plants, have been documented at or near the proposed project sites. A list of these species and a map indicating the location/ranges of rare species in the project area are attached. Rare resources are designated on the map as "element occurrences" and identified with a number that corresponds with the EO\_ID column on the attached spreadsheet. In order to avoid and/or minimize potential impacts to rare resources, TPWD staff

Commissioners

Peter M. Holt  
Chairman  
San Antonio

T. Dan Friedkin  
Vice-Chairman  
Houston

Mark E. Bivins  
Amarillo

J. Robert Brown  
El Paso

Antonio Falcon, M.D.  
Rio Grande City

Karen J. Hixon  
San Antonio

Margaret Martin  
Boerne

Philip Montgomery  
Dallas

John D. Parker  
Lufkin

Lee M. Bass  
Chairman-Emeritus  
Fort Worth

Carter P. Smith  
Executive Director

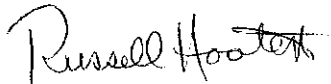


Mr. Lujan  
Page 2  
June 16, 2008

recommends project areas be surveyed for the presence of rare species before initiating any development projects that involve ground disturbances.

I appreciate the opportunity to review and comment on this project. Please contact me at (361) 825-3240 if we may be of further assistance.

Sincerely,

A handwritten signature in black ink that reads "Russell Hooten". The signature is written in a cursive style with a large initial "R" and a stylized "H".

Russell Hooten  
Wildlife Habitat Assessment Program  
Wildlife Division

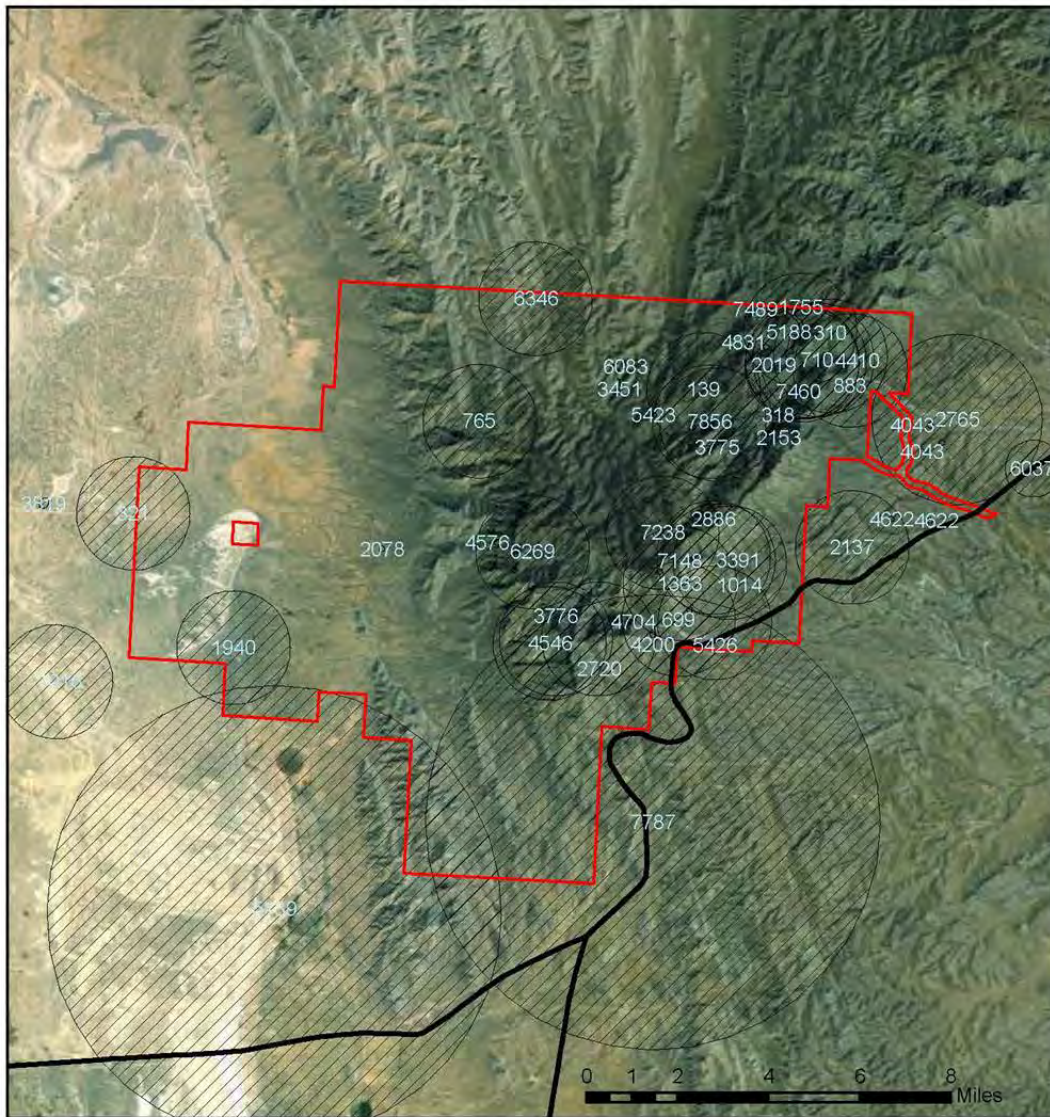
/rh 13115

Attachments




13115 Guadalupe Mountains National Park revised 4-20-11

EO_I D	EO_NU M	SCIENTIFIC	COMMON_NAM	GROUP_CLAS	GRAN K	SRAN K	USES A	TX	LASTOBS	Precs n	Senst v
4043	12	Agave glomeruliflora	Chisos agave	Vascular Plant	G2Q	S2			1989	M	N
4622	11	Agave glomeruliflora	Chisos agave	Vascular Plant	G2Q	S2			1989	M	N
6037	5	Agave glomeruliflora	Chisos agave	Vascular Plant	G2Q	S2			7/5/1947	M	N
2765	8	Agave glomeruliflora	Chisos agave	Vascular Plant	G2Q	S2			5/16/1942	M	N
318	5	Aquilegia chrysantha var. chaplinei	Guadalupe Mountains columbine	Vascular Plant	G4T2	S2			8/20/1986	S	N
7489	1	Aquilegia chrysantha var. chaplinei	Guadalupe Mountains columbine	Vascular Plant	G4T2	S2			8/21/1986	S	N
7094	1	Bat roost		Animal Assemblage	GNR	SNR				S	N
8834	37	Bat roost		Animal Assemblage	GNR	SNR					N
6083	2	Bat roost		Animal Assemblage	GNR	SNR				S	N
3451	3	Bat roost		Animal Assemblage	GNR	SNR				S	N
8835	38	Bat roost		Animal Assemblage	GNR	SNR					N
6269	4	Ericameria nauseosa var. texensis	Guadalupe Mountains rabbitbrush	Vascular Plant	G5T2	S1			1974	M	N
699	3	Ericameria nauseosa var. texensis	Guadalupe Mountains rabbitbrush	Vascular Plant	G5T2	S1			19??	M	N
2886	1	Ericameria nauseosa var. texensis	Guadalupe Mountains rabbitbrush	Vascular Plant	G5T2	S1			10/5/1978	M	N
4546	5	Ericameria nauseosa var. texensis	Guadalupe Mountains rabbitbrush	Vascular Plant	G5T2	S1			1922	M	N
7856	2	Ericameria nauseosa var. texensis	Guadalupe Mountains rabbitbrush	Vascular Plant	G5T2	S1			1978	G	N
2720	1	Escobaria guadalupensis	Guadalupe Mountains pincushion cactus	Vascular Plant	G1	S1				M	Y
5423	2	Escobaria guadalupensis	Guadalupe Mountains pincushion cactus	Vascular Plant	G1	S1			7/15/1975	S	Y
3775	9	Falco peregrinus anatum	American Peregrine Falcon	Vertebrate Animal	G4T3	S2B		T	1984	M	Y
3776	10	Falco peregrinus anatum	American Peregrine Falcon	Animal	G4T3	S2B		T	5/20/1982	M	Y
1755	2	Festuca ligulata	Guadalupe Mountains fescue	Vascular Plant	G1	S1	C		8/10/1952	M	N
4181	2	Hexalectris revoluta	Chisos coral-root	Vascular Plant	G1G2	S1			7/6/1986	S	N
710	19	Hexalectris warnockii	Warnock's coral-root	Vascular Plant	G2G3	S2			7/16/1995	M	N
1016	1	Lepidospartum burgessii	gypsum scalebroom	Vascular Plant	G2	S1			1983-12	M	N
321	5	Lepidospartum burgessii	gypsum scalebroom	Vascular Plant	G2	S1			10/14/1984	M	N
5139	2	Lepidospartum burgessii	gypsum scalebroom	Vascular Plant	G2	S1			7/29/1927	G	N
1940	6	Lepidospartum burgessii	gypsum scalebroom	Vascular Plant	G2	S1				G	N
2078	4	Nolina arenicola	sand sacahuista	Vascular Plant	G2Q	S2			8/13/1975	S	N
7787	6	Nolina arenicola	sand sacahuista	Vascular Plant	G2Q	S2			7/5/1947	M	N
1163	5	Nolina arenicola	sand sacahuista	Vascular Plant	G2Q	S2			9/15/1948	S	N
5188	7	Nolina arenicola	sand sacahuista	Vascular Plant	G2Q	S2			8/31/1950	M	N

5426	2	Nolina arenicola	sand sacahuista	Vascular Plant	G2Q	S2			7/14/1982	M	N
7148	10	Penstemon cardinalis ssp. regalis	royal red penstemon	Vascular Plant	G3T2	S2			7/5/1958	M	N
3391	8	Penstemon cardinalis ssp. regalis	royal red penstemon	Vascular Plant	G3T2	S2			7/10/1949	M	N
310	3	Penstemon cardinalis ssp. regalis	royal red penstemon	Vascular Plant	G3T2	S2			6/13/1983	M	N
2153	11	Penstemon cardinalis ssp. regalis	royal red penstemon	Vascular Plant	G3T2	S2			8/22/1986	S	N
7147	9	Penstemon cardinalis ssp. regalis	royal red penstemon	Vascular Plant	G3T2	S2			8/21/1986	S	N
				Vertebrate							
2137	5	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	Animal	G5	S3			6/19/1986	M	N
765	2	Sophora gypsophila var. guadalupensis	Guadalupe Mountains mescal bean	Vascular Plant	G1T1	S1			19??	M	N
6346	1	Sophora gypsophila var. guadalupensis	Guadalupe Mountains mescal bean	Vascular Plant	G1T1	S1			19??	M	N
883	7	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			5/18/1958	M	N
2019	2	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			5/16/1975	M	N
1363	5	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			7/18/1975	M	N
EO_ID	EO_NUM	SCIENTIFIC	COMMON_NAM	GROUP_CLAS	GRANK	SRANK	USES	TX	LASTOBS	Precsn	Sensiv
2243	9	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			7/29/1952	S	N
7460	8	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			8/4/1962	M	N
4200	3	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			5/23/1975	S	N
4704	1	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			5/26/1975	S	N
4831	4	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			4/28/1975	S	N
4576	6	Streptanthus sparsiflorus	sparsely-flowered jewelflower	Vascular Plant	G2	S2			6/14/1975	S	N
				Vertebrate							
1014	25	Ursus americanus	Black Bear	Animal	G5	S3	SAT	T	1988-09	M	N
				Vertebrate							
7238	24	Ursus americanus	Black Bear	Animal	G5	S3	SAT	T	1989-07	M	N
				Vertebrate							
139	26	Ursus americanus	Black Bear	Animal	G5	S3	SAT	T	1988-11	M	N
				Vertebrate							
4410	27	Ursus americanus	Black Bear	Animal	G5	S3	SAT	T	1989-05	M	N
7007	1	Viola guadalupensis	Guadalupe Mountains violet	Vascular Plant	G1	S1			5/12/1988	S	N



### Rare resources near Guadalupe Mountains National Park

-  Element Occurrence ID
-  Park Boundary
-  Highways

**TEXAS HISTORICAL COMMISSION**  
*real places telling real stories*

April 05, 2011

Fred Armstrong, Acting Superintendent  
Guadalupe Mountains National Park  
HC 60, Box 400  
Salt Flat, Texas 79847-9400

Re: Project review under Section 106 of the National Historic Preservation Act of 1966;  
Guadalupe Mountains National Park's (GUMO) Draft General Management Plan/EIS  
(NPS)

Dear Superintendent Armstrong:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Debra L. Beene, has completed its review. The general management plan states that GUMO will inventory, assess and protect or mitigate cultural resources while consulting with our office throughout the process. We concur that the preferred alternative provides the best protection of cultural resources while providing enhanced interpretive presentations, active management of visitor access and greater day use and overnight opportunities with improved facilities. We understand that GUMO prefers protecting and stabilizing archeological resources in an undisturbed condition and protecting and restoring historic structures.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your assistance in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Debra L. Beene at 512/463-5865.**

Sincerely,



Mark Wolfe, State Historic Preservation Officer

MW/dlb





## PREPARERS AND CONSULTANTS

### PLANNING TEAM

#### Denver Service Center

Erin Flanagan, Project Manager, Community Planner; responsible for impacts on facilities and operations and overall review; 9 years with the National Park Service, 10 years with Environmental Protection Agency; Masters of Resources Law Studies and Masters in Urban and Regional Planning.

Steve Stone, Natural Resource Specialist; responsible for describing the natural resources in the affected environment and environmental consequences chapters; 27 years with the National Park Service; Master of Science, Insect Ecology.

Mark Tabor, Project Manager, Landscape Architect/ASLA; responsible for facilities operations, and overall review; 15 years with the National Park Service; Bachelor of Science and M.L.A.

Larry Van Horn, Cultural Resource Specialist; responsible for describing cultural resources in the affected environment and analyzing the environmental consequences of each alternative for these resources and reporting on Native American consultations; 25 years as a cultural anthropologist and cultural resource specialist in the National Park Service; B.A. in History, M.A. in Anthropology, Ph.D. in Anthropology.

Ann Van Huizen, Project Manager; responsible for overseeing preparation of the final plan/EIS; 34 years with the National Park Service; B.A. in Forest Resource Management/Communications.

#### Guadalupe Mountains National Park

Antonio Armijo, (retired) Roads and Trails Supervisor; responsible for maintenance of roads, trails, and motor vehicle fleet and associated sections in the alternatives, affected environment, and environmental consequences chapters; 33 years at Guadalupe Mountains National Park in maintenance.

Fred Armstrong, Chief of Biological Resources, Interpretation and Visitor Services, (former) Natural Resource Program Manager; collateral duties in cultural resource management; provided field orientations for Denver team members; aided in developing the range of alternatives; 28 years with the National Park Service; B.S. in Natural Resource Management.

Gorden L. Bell, Jr., Natural Resource Program Manager/Geologist/Physical Scientist, responsible for describing physical earth resources in the affected environment and analyzing the environmental consequences of each alternative for these resources; 8 years as a geologist and Physical Resources program manager at Guadalupe Mountains National Park; B.S. in Geology, Ph.D. in Geological Sciences.

Darren Bryant, Facility Manager, (former) Buildings and Utilities Supervisor; responsible for the operations and maintenance of the park's buildings, utilities, and housing; 20 years with the National Park Service, 20 years in Guadalupe Mountains National Park.

Douglas Buehler, (retired) Chief of Interpretation and Visitor Services; responsible for interpretation/visitor experience in the affected environment, alternatives, and environmental consequences chapters; 35 years with the National Park Service; BS in Natural Resources.

Chuck Burton, (former) Facility Manager; responsible for asset maintenance, repair, and operations parkwide; 32 years' experience in construction and maintenance, 24 years with the National Park Service.

Kathy Elmore, (former) Executive Assistant; edited and proofed draft plans; 16 years with the National Park Service and 14 years at Guadalupe Mountains National Park; 3 years college.

John V. Lujan, Former Superintendent; responsible for overall review and development of the management plan; 30 years with the National Park Service, 12 of those years as a national park superintendent; worked in nine national parks and monuments throughout the southwest; BA in history.

Bruce Malloy (former) Supervisory Park Ranger at Guadalupe for 9 years; helped prepare visitor and resource protection issues for plan (currently Chief Ranger at Amistad National Recreation Area); 31 years with the National Park Service. A.S. in Criminal Justice.

Ellis Richard, (retired) Superintendent (2001–2004); responsible for overall review and development of the plan; 32 years with the National Park Service; served as a park interpreter in numerous parks before moving to management at Guadalupe Mountains; BA in Anthropology.

Dennis Vasquez, Superintendent; responsible for overseeing the development and publication of the Final GMP/EIS beginning in 2011. 34 years with the National Park Service, 11 of those years as a national park superintendent; worked in 12 parks and central office assignments throughout the country; BS degree in Biology.

Janice A. Wobbenhorst, Chief of Resource Management and Visitor Protection; park lead for the planning effort, responsible for park coordination of planning efforts, responsible for overall review; 38 years with the National Park Service, and 20 years as Chief Ranger at Guadalupe Mountains National Park; BAE in History and Earth Sciences; MPA in Public Management.

B.J. Ratlief, Chief Ranger; helped review and prepare Final GMP/EIS. 28 years with the National Park Service, BS degree in Public Administration.

Karl Pierce, Chief of Interpretation, Education, and Visitor Services; helped

review and prepare Final GMP/EIS. 24 years with the National Park Service, BS degree in Wildlife and Fisheries Biology.

#### **NPS Harpers Ferry Center**

Sam Vaughn, Associate Manager, Interpretive Planning; responsible for interpretation / visitor experience in the alternatives, affected environment, and environmental consequences chapters; 31 years with the National Park Service; BA in Anthropology and MA in Public Administration.

#### **Publication Services, NPS Denver Service Center**

Christy Fischer, Writer/Editor.

Glenda Heronema, Visual Information Specialist.

Phil Thys, Visual Information Specialist

Angel Lopez, Visual Information Specialist (Student)

#### **CONSULTANTS**

Ron Dutton, Vice President, Hammer Siler George Associates, Denver, CO.

Jan Snyder, Editor and Environmental Scientist, Parsons, Denver, CO.

#### **NPS Denver Service Center**

Greg Cody, Technical Specialist, Design and Construction Division.

David Kreger, Technical Specialist, Transportation Division.

Vicky Magnus, GIS Specialist, NPS Intermountain Region.

J.K. Pinkard, Cartographer, NPS Intermountain Region.

Jennifer Bryant and Elaine Emerson, Editing Services for *Final General Management Plan and Environmental Impact Statement*, Cardno TEC, Inc.



## BIBLIOGRAPHY

Archer, Steven R. and Katherine I. Predick  
2008 "Climate Change and Ecosystems of  
the Southwestern United States."  
Rangelands, June 2008. Society for  
Range Management.

Brown, D. E.

1994 *Biotic Communities, Southwestern  
United States and Northwestern  
Mexico*. Salt Lake City, UT: University  
of Utah Press.

Bureau of Economic Analysis, U.S.  
Department of Commerce

2001 *Regional Economic Information System  
1969-99, Full and Part-Time  
Employment by Industry*. May. CD-  
ROM - RCN-0279.

2001 *Regional Economic Information System  
1969-99, Personal Income by Major  
Source and Earnings by Major  
Industry*. May. CD-ROM - RCN-0279.

2007 Information extracted from "Regional  
Economic Accounts, Personal Income  
and Per Capita Personal Income by  
County." Updated April 2007.  
Available on the Internet at  
<<http://www.bea.gov/regional/reis/>>.

Cornely, J. E.

1991 *Checklist of Mammals: Guadalupe  
Mountains National Park, Culberson  
County, Texas*. Carlsbad, NM:  
Carlsbad Caverns-Guadalupe  
Mountains Association.

City-Data.com

2007 Information extracted from the  
Internet at <[http://www.city-  
data.com/city/](http://www.city-data.com/city/)>.

Council on Environmental Quality

1978 "Regulations for Implementing the  
Procedural Provisions of the National  
Environmental Policy Act." *Code of  
Federal Regulations*, Title 40, Parts  
1500-1508.

1980 "Analysis of Impacts on Prime and  
Unique Agricultural Lands in  
Implementing NEPA." *Federal  
Register* 45: 59189.

1997 *Environmental Justice Guidance under  
the National Environmental Policy Act*.  
Washington, D.C.: Executive Office of  
the President. Available on the  
Internet at  
[http://ceq.eh.doe.gov/nepa/regs/ej/ej.  
pdf](http://ceq.eh.doe.gov/nepa/regs/ej/ej.pdf).

Diffenbaugh, Noah S., Filippo Giorgi, and  
Jeremy S. Pal

2008 "Climate change hotspots in the  
United States." *Geophysical Research  
Letters*, Vol. 35, L16709, doi:  
10.1029/2008gl035075, 2008 Purdue  
University, 30 August 2008.

Eisenberger, Robert and Ross Loomis

2002 *Visitor Experience and Media  
Effectiveness*. Harpers Ferry, WV:  
Draft research report to National Park  
Service, Harpers Ferry Center.

Fenneman, Nevin M

1931 *Physiography of Western United States*.  
McGraw-Hill Book Company.

Fishbein, M. and M. J. Manfredro

1992 "Applying Theory of Reasoned Action  
in Understanding and Influencing  
Recreation Behavior." In *Influencing  
Behavior: Theory and Applications in  
Recreation and Tourism*, edited by M.J.  
Manfredro, pp. 29-50. Sagamore Press.

Grace, Jim W.

1980 *The Herpetofauna of Guadalupe  
Mountains National Park*. Santa Fe,  
NM: Report to NPS Southwest  
Region. Copy available at park  
headquarters.

- 1980 *Annotated Checklist of Amphibians and Reptiles, Guadalupe Mountains National Park, Culberson County, Texas*. Carlsbad, NM: Carlsbad Caverns-Guadalupe Mountains Association. (revised by B. Wauer, 1991)
- Greenberg, Adolph M.
- 1996 *Ethnographic Overview and Assessment of Guadalupe Mountains National Park [Texas]*. Oxford, OH: Department of Sociology, Gerontology, and Anthropology; Miami University of Ohio. Prepared for NPS Intermountain Regional Office, Denver, CO.
- International Human Dimensions Programme on Global Environmental Change
- 2008 Some Guidelines for Helping Natural Resources Adapt to Climate Change. J. S. Baron, S. H. Julius, J. M. West, L. A. Joyce, G. Blate, C. H. Peterson, M. Palmer, B. D. Keller, P. Kareiva, J. M. Scott, and B. Griffith. IHDP Update 2: 46-52.
- International Panel on Climate Change
- 2007 *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY: Edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller. Cambridge University Press.
- Lackey, B. and S. H. Ham
- 2001 *Human-Bear Interaction Assessment, Yosemite National Park, California*. Interim research report submitted to the National Park Service and The Yosemite Fund.
- Meyer, Kathleen
- 1994 *How to Shit in the Woods: An Environmentally Sound Approach to a Lost Art*. Berkeley, CA: Ten Speed Press.
- Molitor, A. B.
- 1995 *The Effects of Persuasive Communication Messages on Backcountry Visitor Behavior in Occupied Grizzly Bear Habitat*. Missoula, MT: Ph.D. dissertation, University of Montana.
- Moscardo, G. M.
- 1999 *Making Visitors Mindful: Principles for Creating Sustainable Visitor Experiences through Effective Communication* (vol. 2). Champaign, IL: Sagamore.
- National Park Service, U.S. Department of the Interior
- 1976 *Master Plan, Guadalupe Mountains National Park, Texas*. Denver, CO: Denver Service Center (FES 76-21).
- 1991 *Cave Management Plan, Guadalupe Mountains National Park*. Copy available at park headquarters.
- 1992 *Land Protection Plan*. Prepared by Guadalupe Mountains National Park and NPS Southwest Regional Office staff.
- 1993 *Guiding Principles of Sustainable Design*. Denver, CO: Denver Service Center.
- 1995a *Cultural Landscape Report for the Frijole Ranch, Guadalupe Mountains National Park, Texas* by Peggy S. Froeschauer. Santa FE, NM: Planning and Professional Services, Southwest Regional Office.
- 1995b *Resources Management Plan with 1995 Update*. Guadalupe Mountains National Park, Texas. Copy available at park headquarters.

- 1995c “*Superintendent’s Compendium to 36 Code of Federal Regulations. Guadalupe Mountains National Park, Texas.*” Copy available at park headquarters.
- 1995d *Backcountry/Wilderness Management Plan.* Guadalupe Mountains National Park, Texas. Copy available at park headquarters.
- 1998a *Director’s Order 28:* [Washington, D.C.]. *Cultural Resources Management.*
- 1998b *Procedural Manual 77-1: Wetland Protection.* [Washington, D.C.]. Available on the Internet at <<http://www.nature.nps.gov/wetland/indexpro.html>>.
- 1999a *Cultural Landscape Inventory: The Pinery Station, Guadalupe Mountains National Park, Texas* by Peggy Froeschauer Nelson. Santa Fe, Nm: Santa Fe Support Office.
- 1999b *Director’s Order 41: Wilderness Preservation and Management.* [Washington, D.C.]
- 2001a *Director’s Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making.* [Washington, D.C.].
- 2001b *The National Park Service Comprehensive Survey of the American Public.* Washington, D.C.: NPS Social Science Program. Northern Arizona University.
- 2002 *Director’s Order 77-1: Wetland Protection.* [Washington, D.C.]. Available on the Internet at <<http://www.nps.gov/policy/DOrders/DO77-1-Reissue.htm>>.
- 2003 *Director’s Order 77-2: Floodplain Management.* [Washington, D.C.]. Available on the Internet at <<http://www.nps.gov/policy/DOrders/DO77-2--Floodplains.pdf>>.
- 2004 *Program Standards for Park Planning.* Associate Director, Park Planning, Facilities, and Lands. Available on the Internet at <<http://planning.nps.gov/document/au9final%20standards%2Epdf>>.
- 2005 *Fire Management Plan for Guadalupe Mountains National Park.* Copy available at park headquarters.
- 2006a “2006 Recreation Visitors Ranked by Number of Visitors.” Available on the Internet at <<http://www2.nature.nps.gov/stats/ranked2006.pdf>>.
- 2006b *Management Policies 2006.* Washington, D.C.: Available on the Internet at <http://www.nps.gov/policy/MP2006.pdf>.
- 2011 ”Economic Benefits to Local Communities from National Park Visitation and Payroll, 2010” Natural Resource Report NPS/NRSS/EQD/NRR – 2011/481. Available on the Internet at <http://www.nature.nps.gov/socialscience/products.cfm#MGM>
- No date *Procedural Manual 77-2: Floodplain Management.* Washington, D.C.: Available on the Internet at <<http://www.nature.nps.gov/rm77/floodplain.cfm>>.
- New Mexico Bureau of Business and Economic Research
- 2004 “Revised Population Projections for New Mexico and Counties.” Available on the Internet at <http://www.unm.edu/%7Ebber/demo/table1.htm>.
- New Mexico Department of Labor, Economic Research and Analysis Unit
- 2001 Table A. Civilian Labor Force, Employment, Unemployment and Unemployment Rate, 2000. February. Downloaded from <<http://www.dol.state.nm.us>>.

- Newman, G.A.
- 1997 *Check-List of Birds: Guadalupe Mountains National Park, Culberson County, Texas*. Carlsbad, NM: Originally published 1983, revised 1991, revised 1997. Carlsbad Caverns-Guadalupe Mountains Association.
- Northington, D. K. and T. L. Burgess
- 1979 "Summary of the Vegetative Zones of the Guadalupe Mountains National Park, Texas." In *Biological Investigations in the Guadalupe Mountains National Park, Texas*. Washington, D.C.: NPS Proceedings and Transactions Series Number Four.
- Secretary of the Interior, The
- 1983 *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines*. [Washington, D.C.] Available on the Internet at <[http://www.cr.nps.gov/local-law/arch\\_stnds\\_0.htm](http://www.cr.nps.gov/local-law/arch_stnds_0.htm)>.
- 1995a *The Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. By Kay D. Weeks and Anne E. Grimmer. Washington, D.C.: National Park Service, Preservation Assistance Division, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services.
- 1995b *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Washington, D.C.: National Park Service, Historic Landscape Initiative.
- Texas Water Development Board
- 2003 Texas Water Resources Planning.
- 2006 "Appendix 4.1: County Population Projections for 2000-2060." In *2007 State Water Plan*. Available on the Internet at <[http://www.twdb.state.tx.us/publications/reports/State\\_Water\\_Plan/2007/2007StateWaterPlan/APP%204\\_112106.pdf](http://www.twdb.state.tx.us/publications/reports/State_Water_Plan/2007/2007StateWaterPlan/APP%204_112106.pdf)>.
- Ulrich, Roger S.
- 1993 In *The Biophilia Hypothesis* by Stephen R. Kellert and Edward O. Wilson, eds. Washington, D.C.: Island Press.
- University of Texas at El Paso
- 1997 *Guadalupe Mountains National Park Visitor Survey*. El Paso, TX: Prepared in cooperation with the National Park Service. Department of Sociology and Anthropology.
- U.S. Census Bureau, U.S. Department of Commerce
- 1990 Information extracted from "1990 Census of Population and Housing Paper Listings." Available on the Internet at <<http://www.census.gov/hhes/www/income/cphls/cphls.html>>.
- 2007 Information extracted from "State and County Quick Facts." Available on the Internet at <<http://quickfacts.census.gov/qfd/index.html>>.
- U.S. Environmental Protection Agency
- 1997 Climate Change and Texas. Office of Policy, Planning and Evaluation (2111). State and Local Climate Change Program. EPA 230-F-97-008qq.
- 1998 *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*. Available on the Internet at [http://www.epa.gov/compliance/resources/policies/ej/ej\\_guidance\\_nepa\\_epa0498.pdf](http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_epa0498.pdf).

U.S. Environmental Protection Agency,  
National Park Service, Texas Commission on  
Environmental Quality, EPRI, and National  
Oceanic and Atmospheric Administration

- 2004 *Big Bend Regional Aerosol and Visibility  
Observational Study, Final Report*. Fort  
Collins, CO: Interagency Monitoring  
of Protected Visual Environments.  
Available on the Internet at:  
[http://vista.cira.colostate.edu/improve/  
/Studies/BRAVO/reports/FinalReport  
/bravofinalreport.htm](http://vista.cira.colostate.edu/improve/Studies/BRAVO/reports/FinalReport/bravofinalreport.htm).

U.S. Fish and Wildlife Service, Department of  
the Interior

- 2007 “Federally Listed as Threatened and  
Endangered Species of Texas,  
September 23, 2007.” Austin, TX:  
Unpublished information obtained  
from the Austin Ecological Services  
office.

Widner, C. J. and J. W. Roggenbuck

- 2000 “Evaluation of Interpretation to  
Reduce Theft of Petrified Wood at  
Petrified Forest National Park.”  
*Journal of Interpretation Research*.  
5(1):1-18.

## INDEX OF KEY WORDS

- air quality, 9, 25, 26, 28, 43, 44, 85, 99, 112, 124, 137, 146, 225, 237, 311, 340, 398, 401, 402, 403
- American Indian, viii, ix, 9, 11, 12, 15, 18, 31, 33, 34, 35, 38, 42, 49, 78, 86, 98, 136, 162, 192, 200, 202, 204, 205, 224, 257, 260, 272, 274, 285, 287, 299, 300, 309, 312, 313, 314, 334, 338, 339, 355, 357, 359, 387, 429
- backcountry zone, viii, ix, x, 61, 66, 70, 78, 89, 91, 92, 99, 100, 101, 104, 107, 112, 113, 115, 125, 129, 130, 150, 152, 153, 156, 405, 410, 412, 417, 422
- backpacking, 210, 212, 215, 262, 383
- Bowl Cabin, 101, 113, 126, 154, 198, 201, 203, 229, 407, 417
- Butterfield Stage, 6, 37, 38, 74, 76, 79, 87, 91, 92, 93, 110, 123, 195, 200, 203, 213, 227, 229, 407
- campground, i, 33, 34, 35, 36, 37, 45, 47, 50, 51, 61, 63, 67, 73, 79, 80, 84, 91, 92, 93, 94, 96, 97, 103, 104, 106, 112, 114, 117, 120, 121, 122, 123, 127, 128, 129, 130, 131, 139, 140, 144, 150, 152, 157, 209, 210, 212, 214, 216, 223, 226, 227, 231, 275, 281, 286, 288, 300, 302, 310, 314, 375, 376, 383, 385, 403, 404, 417, 418
- Carlsbad, 3, 6, 27, 35, 45, 165, 169, 170, 183, 185, 188, 205, 206, 212, 216, 218, 220, 221, 222, 223, 224, 225, 237, 256, 261, 264, 265, 266, 278, 290, 291, 304, 309, 316, 317, 339, 412, 452, 453, 455
- climate change, 38, 39, 44, 105, 173, 174, 181, 182, 184, 215, 401, 402, 409, 452
- costs, cost estimate, iii, v, 8, 30, 58, 70, 71, 72, 73, 75, 89, 90, 105, 106, 116, 130, 131, 145, 147, 223, 224, 296, 354, 366, 374, 419, 420, 430
- Cox Cabin, 35, 101, 113, 201, 229, 407
- cultural landscape, vii, 12, 42, 49, 74, 75, 79, 83, 84, 96, 99, 100, 101, 102, 110, 111, 113, 122, 123, 124, 128, 136, 137, 139, 140, 146, 150, 152, 153, 154, 162, 201, 202, 203, 204, 213, 225, 228, 229, 244, 259, 260, 262, 273, 274, 276, 286, 287, 289, 299, 300, 302, 312, 360, 375, 406, 410, 420, 430, 431, 435
- cultural resources, iii, vii, ix, x, 11, 12, 13, 17, 18, 19, 20, 26, 28, 31, 37, 42, 63, 66, 69, 72, 78, 83, 86, 91, 98, 102, 107, 117, 123, 133, 135, 136, 137, 138, 139, 142, 144, 155, 169, 192, 201, 224, 225, 235, 237, 244, 309, 311, 313, 354, 357, 359, 362, 366, 374, 375, 382, 407, 411, 413, 414, 420, 429, 430, 431, 448
- Deferred maintenance, 71, 72, 90, 106, 116, 131, 165, 265, 266
- Dell City, 22, 26, 28, 50, 76, 84, 88, 124, 127, 153, 164, 169, 170, 192, 215, 216, 217, 221, 222, 224, 225, 226, 228, 229, 236, 263, 309, 310, 317, 339, 382, 385, 387
- designated wilderness, iii, viii, ix, x, 16, 18, 19, 27, 34, 53, 61, 63, 65, 66, 69, 70, 78, 91, 92, 97, 98, 99, 100, 104, 107, 112, 117, 124, 125, 128, 129, 130, 147, 151, 152, 153, 156, 157, 188, 209, 229, 258, 272, 282, 288, 369, 370, 377, 386, 396, 405, 410, 411, 412, 414, 422
- developed zone, x, 67, 69, 91, 92, 96, 97, 99, 101, 107, 111, 113, 117, 121, 122, 123, 124, 139, 152, 417, 423
- Dog Canyon, ix, 6, 27, 35, 47, 48, 74, 75, 84, 88, 89, 97, 104, 105, 111, 115, 117, 122, 123, 127, 128, 129, 130, 139, 156, 157, 163, 165, 169, 170, 173, 180, 195, 199, 202, 203, 209, 210, 211, 212, 214, 216, 223, 224, 226, 227, 228, 230, 231, 249, 250, 252, 262, 265, 276, 278, 281, 302, 303, 304, 376, 379, 385, 403, 404, 417, 423, 425, 432
- Eddy County, 216, 217, 219, 220, 221, 222, 317
- education, iii, vii, 10, 13, 17, 18, 20, 26, 41, 48, 63, 67, 72, 82, 85, 87, 88, 97, 99, 100, 102, 104, 114, 115, 124, 125, 126, 127, 128, 130, 132, 134, 135, 137, 150, 153, 155, 157, 159, 161, 164, 207, 225, 228, 249, 257, 258, 263, 264, 276, 277, 289, 296, 297, 298, 301, 303, 304, 306, 339, 348, 354, 365, 374, 375, 377, 381, 386, 387, 407, 410, 411, 428, 449
- El Capitan, 6, 25, 32, 36, 37, 59, 79, 96, 120, 132, 169, 172, 205, 211, 214, 231, 248, 260, 267
- endangered species, 11, 15, 51, 85, 99, 112, 124, 134, 183, 310, 338, 351, 403

- endemic, 17, 18, 34, 35, 177, 181, 182
- environmental justice, 20, 46, 239, 452, 455
- erosion, 10, 32, 40, 53, 54, 63, 65, 66, 134, 135, 156, 158, 174, 175, 235, 236, 243, 249, 250, 251, 254, 255, 256, 259, 268, 270, 281, 293, 296, 344, 348, 350, 384, 399, 421, 433
- ethnographic resources, vii, 12, 42, 86, 101, 113, 125, 136, 146, 162, 204, 225, 244, 260, 267, 274, 280, 287, 300, 301, 306, 357, 359, 435
- exhibits, viii, ix, x, 12, 76, 82, 84, 88, 91, 92, 93, 96, 97, 98, 100, 102, 103, 107, 111, 114, 117, 121, 122, 123, 126, 127, 136, 139, 140, 144, 150, 155, 207, 212, 213, 225, 227, 228, 263, 275, 276, 277, 278, 289, 302, 303, 304, 361, 417, 420, 429, 430
- exotic species, 9, 30, 52, 86, 89, 100, 106, 112, 116, 125, 154, 236, 251, 252, 253, 269, 282, 294, 338, 342, 343, 402, 403, 413, 414
- fire, fire management, ix, 9, 27, 31, 50, 74, 75, 85, 86, 180, 194, 206, 222, 225, 230, 231, 261, 264, 277, 301, 304, 340, 343, 361, 365, 379, 381, 382, 396, 400, 411, 412, 419, 432
- floods, flooding, 9, 35, 47, 48, 93, 171, 173, 174, 175, 198, 296, 310, 311, 335, 336, 344, 403, 418
- floodplain, 9, 47, 48, 136, 311, 335, 344, 379, 403, 454
- Frijole Ranch, viii, ix, x, 6, 32, 33, 48, 61, 69, 74, 76, 78, 83, 87, 88, 89, 91, 92, 93, 96, 101, 102, 103, 104, 105, 106, 107, 110, 113, 114, 115, 117, 121, 125, 126, 127, 128, 129, 130, 131, 139, 140, 146, 150, 156, 158, 163, 183, 196, 197, 201, 202, 210, 211, 212, 213, 224, 225, 226, 228, 231, 249, 250, 251, 252, 258, 259, 262, 267, 269, 273, 276, 279, 281, 282, 286, 291, 294, 299, 302, 303, 306, 314, 356, 375, 376, 377, 379, 407, 409, 418, 420, 423, 425, 431, 434, 453
- frontcountry zone, x, 66, 67, 92, 93, 96, 99, 107, 110, 113, 115, 117, 121, 122, 150, 375, 404
- geology, 17, 19, 34, 41, 83, 98, 103, 159, 172, 185, 206, 211, 212, 213, 227, 242, 243, 255, 270, 271, 283, 284, 296, 297, 346, 382, 383, 385, 387, 430, 448
- Guadalupe Pass, 25, 28, 31, 37, 75, 84, 91, 104, 112, 124, 153, 171, 195, 197, 205, 211, 236, 381, 399, 404, 409
- Guadalupe Peak, 6, 32, 36, 37, 77, 79, 85, 92, 99, 129, 132, 147, 169, 172, 197, 198, 205, 209, 227, 369, 370, 384, 399
- health, 9, 13, 18, 26, 43, 46, 50, 52, 74, 85, 86, 100, 112, 125, 142, 144, 145, 198, 239, 264, 342, 345, 351, 352, 354, 365, 379, 411, 412, 414, 416, 429, 432
- highways, 24, 88, 214, 220, 253, 400
- Hiker, 249
- hiking, 6, 31, 63, 87, 88, 89, 97, 104, 107, 111, 115, 128, 129, 130, 156, 161, 180, 191, 199, 207, 209, 211, 212, 214, 226, 229, 257, 261, 262, 271, 275, 284, 288, 297, 301, 344, 382, 383, 385, 404, 405, 437
- historic landscapes, 138, 204
- horseback riding, 31, 63, 89, 144, 212, 214, 261, 290, 383, 421, 429
- horses, 53, 84, 99, 135, 154, 158, 161, 196, 197, 210, 228, 230, 255, 257, 271, 282, 288, 294, 298, 302, 306, 377, 384, 420, 421, 422, 430, 433
- Hudspeth County, 24, 26, 170, 216, 217, 219, 220, 221, 222, 317, 339, 433
- Hunter Line Cabin, Hunter Cabin, 34, 73, 199, 203, 213, 227, 228
- implementation, xiii, 8, 15, 29, 43, 44, 46, 48, 52, 60, 70, 71, 72, 75, 76, 79, 86, 90, 105, 132, 133, 134, 137, 139, 140, 162, 163, 165, 168, 227, 235, 246, 252, 257, 258, 259, 260, 261, 262, 264, 268, 278, 281, 290, 291, 293, 304, 381, 396, 397, 398, 401, 402, 403, 404, 405, 411, 415, 417, 419, 420, 421, 428, 432, 435
- interpretation, i, vii, 10, 12, 18, 19, 31, 41, 42, 66, 71, 78, 79, 84, 87, 88, 89, 97, 102, 110, 114, 118, 121, 126, 127, 131, 137, 140, 150, 152, 155, 161, 163, 164, 197, 203, 205, 207, 212, 224, 225, 229, 245, 255, 257, 258, 263, 264, 271, 275, 276, 277, 284, 287, 289, 290, 297, 302, 303, 304, 338, 348, 361, 366, 375, 377, 381, 386, 387, 406, 411, 419, 428, 429, 448, 449, 456
- invasive species, 52, 154, 182, 184, 269, 294, 375, 413, 414
- maintenance, ix, x, 13, 32, 34, 36, 42, 53, 54, 63, 67, 71, 72, 73, 82, 88, 90, 91, 92, 94, 106, 116, 131, 134, 139, 156, 158, 159, 165, 218, 223, 224, 225, 226, 227, 229, 230, 231, 235, 237, 243, 246,



- 247, 249, 250, 252, 254, 255, 256, 257, 258, 264, 265, 266, 268, 269, 270, 272, 273, 278, 279, 280, 281, 282, 283, 285, 286, 290, 291, 292, 293, 294, 296, 298, 299, 305, 352, 356, 360, 366, 379, 385, 408, 411, 419, 420, 427, 429, 448
- management zone, vii, 25, 58, 60, 61, 62, 68, 69, 70, 91, 99, 107, 117, 153, 282, 310, 342, 350, 404, 405, 415, 421, 422, 434
- Manzanita Spring, 33, 48, 49, 73, 74, 83, 112, 146, 158, 195, 202, 249, 251, 260, 425, 428, 431
- McKittrick Canyon, iv, ix, 6, 27, 32, 34, 53, 60, 75, 83, 88, 96, 97, 102, 103, 110, 114, 117, 121, 122, 127, 128, 135, 141, 151, 159, 163, 172, 173, 177, 181, 182, 183, 184, 185, 195, 196, 198, 199, 202, 204, 209, 211, 212, 213, 214, 224, 228, 230, 249, 250, 252, 260, 262, 263, 275, 276, 277, 289, 296, 297, 302, 303, 304, 306, 352, 375, 379, 381, 399, 400, 402, 405, 407, 409, 410, 413, 416, 423
- motorized scenic corridor zone, 67, 69, 97, 98, 99, 111, 124, 417
- National Environmental Policy Act, 3, 15, 40, 42, 45, 46, 47, 48, 49, 50, 133, 142, 145, 146, 149, 168, 216, 235, 311, 335, 396, 401, 403, 404, 413, 423, 424, 425, 426, 427, 428, 435, 436, 452
- National Historic Preservation Act, 19, 26, 42, 49, 133, 235, 244, 273, 286, 311, 335, 338, 355, 356, 357, 358, 359, 360, 361, 420
- National Register of Historic Places, 11, 12, 34, 49, 79, 101, 113, 125, 136, 169, 195, 196, 197, 198, 199, 200, 201, 203, 204, 229, 244, 311, 314, 355, 356, 359, 360, 407, 431, 432
- natural resources, vii, viii, 9, 10, 11, 12, 18, 19, 25, 26, 32, 38, 48, 49, 72, 85, 142, 144, 175, 220, 235, 237, 240, 312, 314, 344, 357, 360, 366, 374, 401, 402, 423, 429, 431, 432, 433, 434, 448
- nonnative, 52, 134, 141, 251, 342
- orientation, vii, 31, 42, 45, 71, 72, 76, 78, 84, 87, 88, 89, 97, 98, 102, 106, 111, 114, 116, 117, 127, 131, 150, 152, 155, 164, 207, 212, 215, 263, 276, 277, 289, 303, 304, 374, 376, 377, 428
- Otero County, 24, 216
- paleontology, paleontological, vii, 10, 18, 19, 24, 31, 33, 36, 38, 41, 54, 66, 85, 89, 100, 112, 124, 134, 146, 153, 161, 175, 187, 188, 191, 243, 244, 255, 256, 257, 266, 271, 272, 279, 284, 285, 291, 297, 298, 305, 306, 309, 348, 430, 432, 435
- parking, x, 32, 33, 37, 38, 50, 54, 63, 66, 67, 69, 74, 75, 79, 82, 83, 84, 87, 88, 91, 92, 93, 94, 96, 98, 103, 104, 108, 110, 111, 112, 115, 120, 121, 123, 127, 128, 135, 139, 140, 150, 152, 155, 161, 163, 210, 212, 213, 215, 225, 226, 227, 228, 229, 249, 250, 252, 255, 257, 262, 272, 274, 275, 278, 281, 282, 283, 284, 285, 288, 289, 291, 298, 300, 301, 302, 314, 344, 352, 362, 382, 404, 417, 422, 423, 429
- Patterson Hills, 27, 28, 37, 77, 85, 99, 236, 369, 370, 399, 409
- Pine Springs, i, viii, ix, x, 6, 27, 32, 33, 36, 47, 51, 61, 69, 78, 79, 82, 83, 87, 88, 91, 92, 93, 94, 96, 100, 102, 103, 104, 106, 107, 110, 112, 114, 115, 117, 120, 121, 126, 127, 128, 129, 130, 131, 139, 140, 144, 150, 163, 165, 169, 170, 171, 173, 197, 202, 207, 209, 210, 211, 212, 213, 214, 215, 222, 224, 225, 226, 227, 228, 229, 230, 231, 249, 250, 252, 262, 263, 265, 266, 267, 275, 276, 278, 281, 289, 302, 303, 304, 314, 369, 375, 376, 377, 379, 382, 384, 385, 386, 403, 418, 423, 425, 434
- Pinery, 32, 74, 78, 79, 91, 93, 110, 118, 129, 150, 162, 195, 196, 197, 200, 201, 203, 209, 212, 213, 227, 229, 258, 259, 286, 299, 300, 302, 406, 407, 454
- plant communities, vii, 41, 158, 175, 177, 182, 240, 250, 251, 252, 268, 269, 279, 282, 294, 295, 305, 342, 343, 345, 424, 431, 432
- plants, 10, 18, 24, 43, 44, 52, 65, 66, 67, 85, 86, 100, 102, 112, 124, 125, 134, 154, 158, 162, 173, 175, 177, 180, 181, 182, 192, 194, 202, 205, 211, 236, 241, 250, 251, 260, 261, 269, 274, 282, 287, 294, 295, 300, 310, 340, 342, 345, 347, 351, 382, 383, 384, 385, 387, 398, 403, 409, 413, 414, 415, 416, 428, 435
- Pratt Cabin, 34, 75, 83, 84, 88, 96, 97, 111, 114, 117, 121, 122, 126, 127, 128, 131, 151, 159, 197, 204, 213, 228, 230, 231, 258, 296, 297, 302, 306, 314, 356, 379, 385, 386, 409, 410, 420, 422, 431
- PX Well, 25, 37, 75, 84, 91, 99, 104, 111, 117, 124, 129, 147, 153, 156, 275, 370, 404, 422
- Queen, 22, 169, 170, 216, 222, 223, 309
- ranch, 15, 22, 31, 33, 34, 35, 36, 37, 54, 74, 76, 83, 84, 87, 89, 96, 98, 101, 102, 104, 105, 107, 110, 113, 114, 115, 121, 123, 126, 127, 129, 130, 140, 146, 148, 150, 152, 156, 161, 169, 192, 194, 196, 197, 198, 199, 200, 201, 202, 203, 213, 214, 217, 221, 228, 229, 231, 235, 250, 251, 253, 255, 256,

- 258, 262, 272, 273, 276, 279, 286, 288, 293, 299,  
302, 303, 309, 310, 314, 356, 370, 375, 376, 387,  
399, 406, 418, 431, 436
- ranching, iii, x, 15, 31, 34, 35, 36, 74, 76, 87, 96,  
101, 102, 104, 113, 115, 121, 126, 129, 150, 161,  
169, 192, 194, 196, 198, 199, 200, 201, 202, 203,  
217, 229, 235, 250, 251, 253, 255, 256, 258, 272,  
276, 279, 293, 314, 370, 387, 418, 431
- religious significance, 42
- roads, 22, 26, 27, 35, 41, 52, 63, 66, 67, 69, 88, 97,  
128, 133, 138, 140, 147, 155, 156, 161, 194, 211,  
224, 225, 226, 227, 229, 236, 249, 250, 251, 252,  
253, 255, 256, 266, 275, 293, 297, 298, 301, 356,  
360, 362, 370, 375, 382, 384, 385, 387, 399, 403,  
410, 417, 423, 436, 437, 448
- sacred sites, 12, 20, 42, 357, 359
- safety, 9, 13, 19, 25, 26, 31, 32, 49, 50, 74, 80, 87,  
89, 101, 122, 125, 132, 137, 142, 144, 145, 154,  
199, 203, 222, 224, 226, 230, 239, 254, 261, 314,  
339, 342, 343, 347, 354, 362, 365, 379, 386, 387,  
412, 414
- Salt Basin Dunes, viii, ix, x, 26, 32, 36, 52, 61, 84,  
88, 91, 97, 98, 103, 104, 106, 107, 111, 112, 113,  
115, 117, 123, 124, 127, 128, 129, 130, 139, 140,  
145, 152, 155, 156, 157, 158, 159, 163, 170, 182,  
183, 184, 189, 205, 211, 215, 216, 228, 229, 254,  
262, 274, 275, 276, 277, 281, 282, 283, 284, 285,  
288, 289, 291, 293, 294, 296, 297, 300, 301, 302,  
303, 304, 306, 312, 369, 370, 404, 405, 406, 407,  
429
- scenery, 20, 28, 37, 149, 169, 203, 207, 211, 262,  
288, 386, 434, 435
- scenic vistas, 19, 34, 35, 43, 169, 211, 236, 237,  
370, 383, 398, 399, 402, 416
- Section 106, 49, 244, 311
- Section 7, 310, 314
- Ship-on-the-Desert, ix, 32, 33, 73, 84, 88, 99, 101,  
102, 104, 111, 113, 124, 126, 127, 128, 130, 131,  
153, 157, 163, 198, 204, 227, 228, 230, 231, 249,  
250, 252, 262, 273, 275, 276, 277, 286, 300, 303,  
314, 377, 379, 382, 383, 404, 406, 420, 423
- Smith Spring, 33, 48, 49, 83, 96, 112, 121, 125,  
129, 150, 154, 161, 183, 209, 213, 297, 298, 306
- soil, 10, 28, 40, 44, 53, 54, 65, 66, 134, 135, 158,  
173, 175, 181, 236, 240, 249, 250, 251, 255, 256,  
268, 279, 281, 284, 293, 294, 305, 336, 345, 350,  
399, 407, 424, 431, 432, 433
- stagecoach, 74, 79, 93, 194, 195, 197, 203, 206,  
220, 384, 406, 407
- traffic, 25, 26, 49, 67, 123, 137, 147, 237, 249, 252,  
253, 268, 281, 293, 367
- trail, ix, 24, 25, 32, 33, 34, 35, 36, 37, 49, 51, 53,  
63, 66, 67, 75, 79, 83, 84, 85, 92, 96, 97, 98, 99,  
102, 104, 107, 110, 111, 114, 115, 118, 121, 122,  
123, 124, 125, 129, 134, 135, 140, 150, 151, 152,  
155, 156, 158, 161, 165, 187, 197, 199, 200, 201,  
203, 209, 212, 213, 214, 215, 226, 227, 228, 237,  
243, 248, 249, 250, 251, 252, 253, 254, 255, 257,  
258, 259, 263, 266, 268, 270, 271, 272, 278, 279,  
281, 283, 284, 285, 291, 293, 294, 296, 297, 298,  
305, 306, 310, 314, 362, 370, 375, 376, 377, 382,  
383, 384, 385, 400, 405, 408, 410, 411, 412, 417,  
436
- trailhead, x, 25, 32, 33, 35, 61, 75, 76, 79, 82, 83,  
84, 91, 93, 96, 97, 98, 99, 103, 104, 110, 111,  
112, 115, 117, 120, 121, 122, 123, 124, 128, 129,  
130, 150, 151, 152, 153, 155, 156, 157, 163, 209,  
210, 212, 213, 223, 228, 229, 274, 275, 281, 282,  
283, 284, 285, 288, 289, 300, 302, 314, 385, 404,  
417
- U.S. Highway 62/180, 3, 37, 78, 79, 83, 91, 92, 94,  
104, 107, 108, 110, 120, 121, 128, 130, 150, 169,  
170, 213, 216, 229, 230, 236, 237, 251, 253, 255,  
256, 260, 264, 290, 399, 400, 409, 434
- Van Horn, 169, 170, 196, 200, 201, 216, 220, 221,  
222, 309, 317, 339, 448
- vegetation, vii, 10, 17, 33, 34, 39, 40, 41, 44, 54,  
65, 66, 69, 79, 100, 112, 133, 134, 135, 154, 158,  
174, 175, 177, 179, 180, 181, 184, 192, 209, 225,  
236, 240, 241, 249, 250, 251, 252, 253, 254, 259,  
267, 268, 269, 270, 274, 279, 281, 282, 283, 286,  
291, 293, 294, 295, 300, 305, 306, 343, 347, 360,  
382, 398, 404, 415, 423, 424, 431, 432, 433, 437
- vehicle, viii, 25, 26, 31, 32, 44, 45, 47, 50, 63, 78,  
79, 80, 82, 84, 88, 93, 103, 110, 111, 115, 122,  
123, 128, 144, 147, 148, 150, 151, 152, 175, 210,  
212, 214, 223, 225, 228, 230, 252, 262, 276, 281,  
282, 303, 310, 366, 382, 403, 418, 422, 448
- viewshed, 31, 47, 69, 236, 237, 276, 289, 303, 398,  
399, 409

- visitor center, i, 6, 31, 32, 33, 47, 50, 61, 63, 74, 76, 78, 79, 82, 87, 88, 91, 92, 93, 96, 100, 102, 103, 104, 108, 114, 117, 126, 127, 128, 130, 139, 144, 150, 206, 207, 209, 210, 211, 212, 213, 214, 216, 220, 225, 227, 228, 229, 230, 231, 237, 261, 263, 276, 277, 303, 376, 377, 400, 403, 407, 409, 429, 430, 434
- visitor experience, iii, iv, v, 10, 13, 17, 18, 35, 37, 39, 42, 45, 58, 60, 62, 63, 65, 66, 67, 69, 70, 72, 87, 96, 98, 106, 125, 131, 132, 133, 144, 174, 207, 239, 246, 262, 264, 348, 362, 364, 367, 374, 376, 401, 402, 412, 414, 415, 418, 421, 424, 425, 429, 430, 434, 448, 449
- visual, 13, 25, 49, 69, 80, 88, 102, 137, 187, 190, 207, 211, 367, 368, 382, 385, 398, 410, 449, 456
- wetland, 47, 48, 86, 100, 112, 125, 135, 154, 353, 428, 431, 454
- Whites City, 4, 169, 170, 216, 220, 223
- wilderness, i, v, viii, ix, x, 3, 8, 11, 16, 17, 18, 19, 25, 27, 31, 32, 34, 35, 43, 51, 53, 54, 60, 61, 63, 65, 66, 68, 69, 72, 78, 84, 85, 87, 91, 92, 93, 96, 97, 98, 99, 100, 102, 103, 104, 107, 108, 110, 111, 112, 114, 115, 116, 117, 123, 124, 125, 126, 127, 128, 130, 139, 140, 147, 148, 150, 151, 152, 153, 155, 156, 188, 207, 210, 236, 237, 252, 258, 262, 276, 288, 309, 317, 337, 343, 354, 369, 370, 372, 374, 375, 376, 377, 382, 383, 384, 385, 386, 396, 397, 403, 404, 405, 407, 408, 410, 411, 412, 413, 414, 415, 417, 419, 422, 423, 424, 425, 427, 428, 434, 437, 454
- wilderness threshold zone, x, 66, 92, 97, 107, 111, 128, 130, 150, 156, 405
- wildlife, vii, 10, 26, 27, 28, 30, 31, 33, 34, 35, 36, 37, 39, 40, 41, 42, 51, 63, 85, 86, 100, 112, 124, 134, 135, 146, 149, 154, 159, 174, 175, 180, 181, 182, 184, 192, 200, 207, 210, 236, 237, 241, 242, 252, 253, 254, 262, 266, 270, 279, 283, 291, 295, 305, 309, 310, 314, 316, 317, 335, 339, 341, 347, 351, 362, 367, 381, 382, 383, 384, 404, 415, 416, 417, 423, 431, 432, 435, 449, 456
- Williams Ranch, ix, x, 32, 37, 50, 54, 59, 70, 74, 84, 88, 89, 91, 98, 99, 101, 103, 104, 107, 111, 113, 117, 123, 125, 128, 129, 140, 147, 152, 155, 163, 170, 199, 200, 204, 211, 214, 227, 229, 249, 250, 258, 262, 273, 275, 276, 281, 282, 283, 284, 285, 286, 289, 300, 301, 302, 303, 310, 314, 370, 375, 379, 382, 385, 404, 405, 407, 417, 420, 422
- Williams Ranch Road, 54, 59





As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS D-130A August 2012



Printed on recycled paper

National Park Service  
U.S. Department of the Interior

Guadalupe Mountains National Park  
Texas